

MOTORSHIP

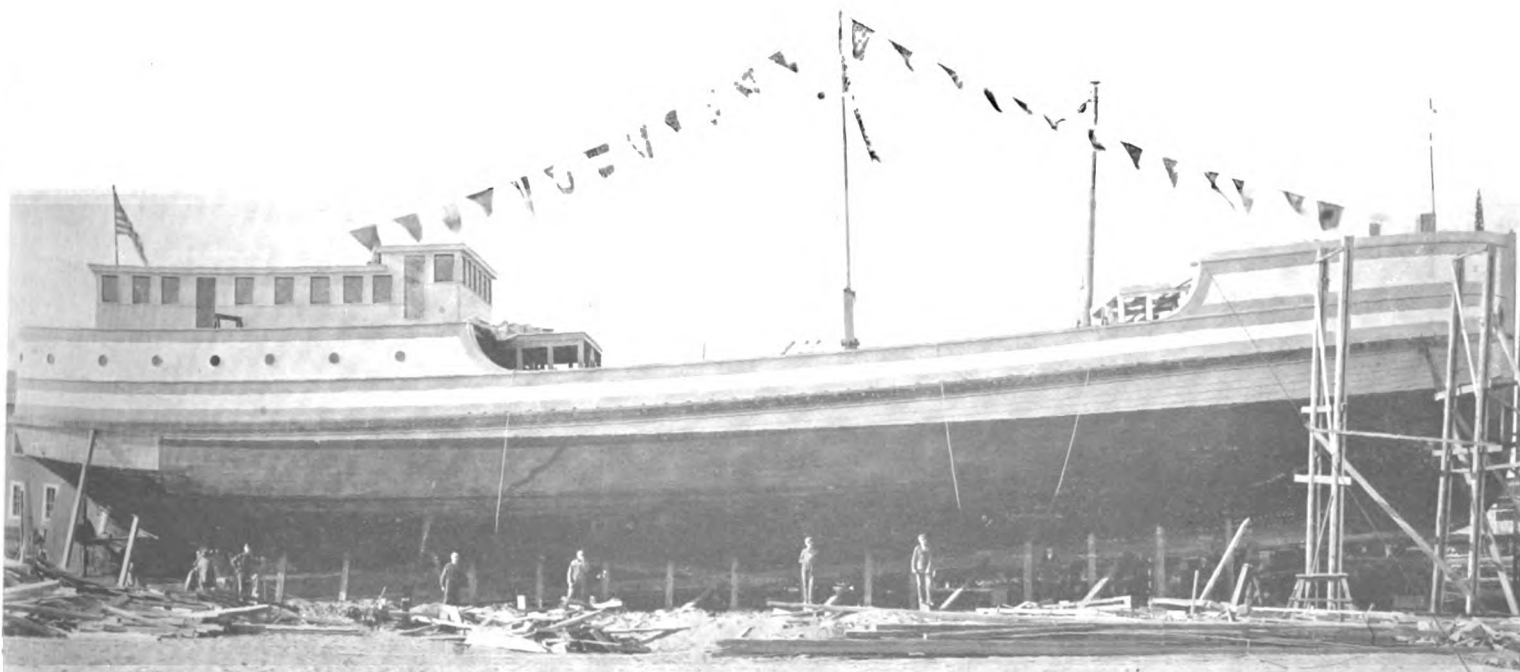
(Trademark Registered, U. S. Patent Office)

In the Interests of Commercial Motor Vessels

Vol. I

SEATTLE, U. S. A., MAY, 1916

No. 2



MOTORSHIP KUSKOKWIM RIVER READY FOR LAUNCHING

(See Page 4)

MILLER FREEMAN, Publisher

1321 L. C. SMITH BLDG., SEATTLE, U. S. A.

also Prince Rupert, B. C. Vancouver, B. C. San Francisco, Cal. Los Angeles Harbor, Cal.

Application made for entry as second-class matter at Seattle postoffice.

Vol. I.

Seattle, U. S. A., May, 1916.

No. 2.

British Columbia Considers Ship Subsidy

Passage of New Act Will Probably Mean Construction of Twenty Auxiliary Motor Vessels

Few pieces of legislation have attracted as much general attention throughout the United States as the British Columbia Shipping Act, introduced a few weeks ago in the Provincial Parliament at Victoria. The new act aims to stimulate shipbuilding and provides for the construction of both vessels and yards with the co-operation of the provincial government. It authorizes the issuance of securities to the value of \$2,000,000 without further act of parliament and provides for the construction eventually of twenty vessels. It is worthy of note in its earnest direct effort to establish a concrete nucleus for a merchant marine fleet on the Canadian Pacific Coast. It is of particular interest to readers of MOTORSHIP because of the fact that practically all of the concerns now planning to operate under it intend to build auxiliary motor vessels.

While some little criticism has arisen among those classes who can see in it nothing but an effort to specially benefit the shipping interests it is anticipated that the bill will pass without a great deal of opposition.

Passage of the bill will provide a shipping credit commission with power to lend money to construct ships; to subsidize ships when constructed and to guarantee the bonds of shipbuilding concerns to 6 per cent.

The commission will be composed of two directors and a superintendent, all to be appointed by the government. The deputy minister of finance will be ex-officio member.

The board will borrow money through the government and lend it to shipbuilders at 6 per cent interest, the money to be repaid within five years. One-fifth of the principal must be repaid each year.

Each loan is limited to 55 per cent of the value of the ship, which must be built and registered in British Columbia. The province's security is ironclad. The commission gets a first mortgage on the whole value of the vessel; the owning company must be able to provide suitable references; the craft must be insured in favor of the commission; and, above all, the commission is made managing owner of her until the loan is repaid. She must not leave the British Columbia trade until the money is again in the hands of the government. That is to say, the board shall have full control of the vessel from the time the loan is made until it is paid back, and the board cannot lose money even if the ship goes down on her first trip.

The operating cost of the commission is provided by a reserve fund constituting 1 per cent of the gross earnings of all the vessels on which money is loaned. Two million dollars can be loaned by the board without consulting the legislature, but the approval of the latter body is necessary after that.

The plans and specifications of the ship must be approved by the commission; white labor only shall construct and work her; fair wages shall prevail; she must not be sold or transferred without the consent of the commission for five years after the loan is made, and every charter shall be subject to the approval of the commission while the loan is in existence.

Probably the most important provision from the standpoint of the lumbering industry is that the owners of the vessels constructed according to the provisions of the bill must not charge a larger freight rate than is prevalent for similar commodities in the state of Washington. The value of this clause is apparent when it is considered that it costs over a dollar more per ton

to ship lumber from British Columbia ports than it does from Washington ports. The measure, of course, applies only to ocean-going vessels of any kind upon which construction is commenced within a year from the passage of the bill.

The second part of the board's powers refers to subsidies to new vessels constructed either by means of loans from the commission or otherwise. Craft up to the number of twenty will be bonused to the maximum extent of \$5 a ton per year for a period of ten years. The subsidizing provision will, however, apply only after the war, when a possible reduction in the earning power of the vessel may occur.

This fact is indicated by the restriction that no boat shall benefit by the subsidy proposal which is earning 15 per cent interest for its owners. At present deep sea craft are making at least 20 and in many cases over 100 per cent a year. The commission for a ten-year period, beginning a year after peace is declared, will make up any deficiency between the ship's earning capacity and 15 per cent of her actual cost.

The section is inserted in order to insure the operation of vessels from B. C. ports even after the war. It is essential to the future of the lumber industry. But possibly the most important section of the measure to Vancouver directly is that applying to the establishing of shipbuilding, repairing and docking plants in the province. Taken with the offers said to have been made by several companies, it guarantees the employment of some thousands of men in new plants probably not far from Vancouver.

The bill guarantees 55 per cent of the actual cost of constructing these plants, the guaranteed interest rate on bonds being 6 per cent.

The proposed act is being discussed fully by all important public bodies in Vancouver and sharp lines of conflict are being drawn. The genesis of the act is the inability of mill men to get bottoms on which to ship lumber for export, owing to the high freight rates and scarcity of carriers due to the war. The inability of mill men to develop a large export trade from B. C. is no new situation; nor is the clamor to build ships in B. C. a matter of recent occurrence, for during every year of the past twenty mill men have been crying that they could do an enormous export trade if they were provided with the ships.

There are those business men who think that the mill men should have built their own ships years ago, and it is this thought that is at the back of the present bill introduced by the government in the Victoria legislature. If the mill men are sincere in their claims that there is a great export lumber trade for them, then they will take advantage of the proposed aid from the government, and with their own enterprise and faith in their business will build the necessary ships to take care of all shipments. The chief objection, however, to the proposed bill is from the mill men themselves who think the suggested government aid is not enough; they would prefer a subsidy of £1 a thousand on all exported lumber. The man on the street is willing to have the government aid the mill men to build ships, but desires to see the latter evince a more commendable public spirit and do something for themselves, a task for which their long prosperity seems eminently to fit them at this time.

Of course present established steamship lines oppose the new order, for while the bill contemplates for the present only wooden ships, yet it may, in the future, take in steel ships. Besides that the bill creates strong competition with the older order.

It is stated that whereas the first draft of the bill proposed to aid 20 ships, a second draft adds five to the number. All the ships built will have auxiliary power and there is much interest being taken in its progress by the builders and agents of marine engines throughout Canada. There is little doubt that the bill will become law, and with its forming a new era in marine engine work and agency will have begun in B. C.

B. C. PORT AIDS SHIPBUILDING.

The town of Port Moody, B. C., is extending aid municipally to shipbuilding by guaranteeing certain of the securities of Boyd's, Ltd., a corporation which has been formed to carry on a general shipbuilding and repairing business at that point. The following official statement was issued from the head office of the company in the Pacific building, Vancouver, B. C.:

"We shall go to work immediately on our project and in three months from today we expect to have our plant in shape for the laying of the first keel. Four months after that we hope to launch our first vessel and nine months from today she should be ready to load and sail with her first cargo."

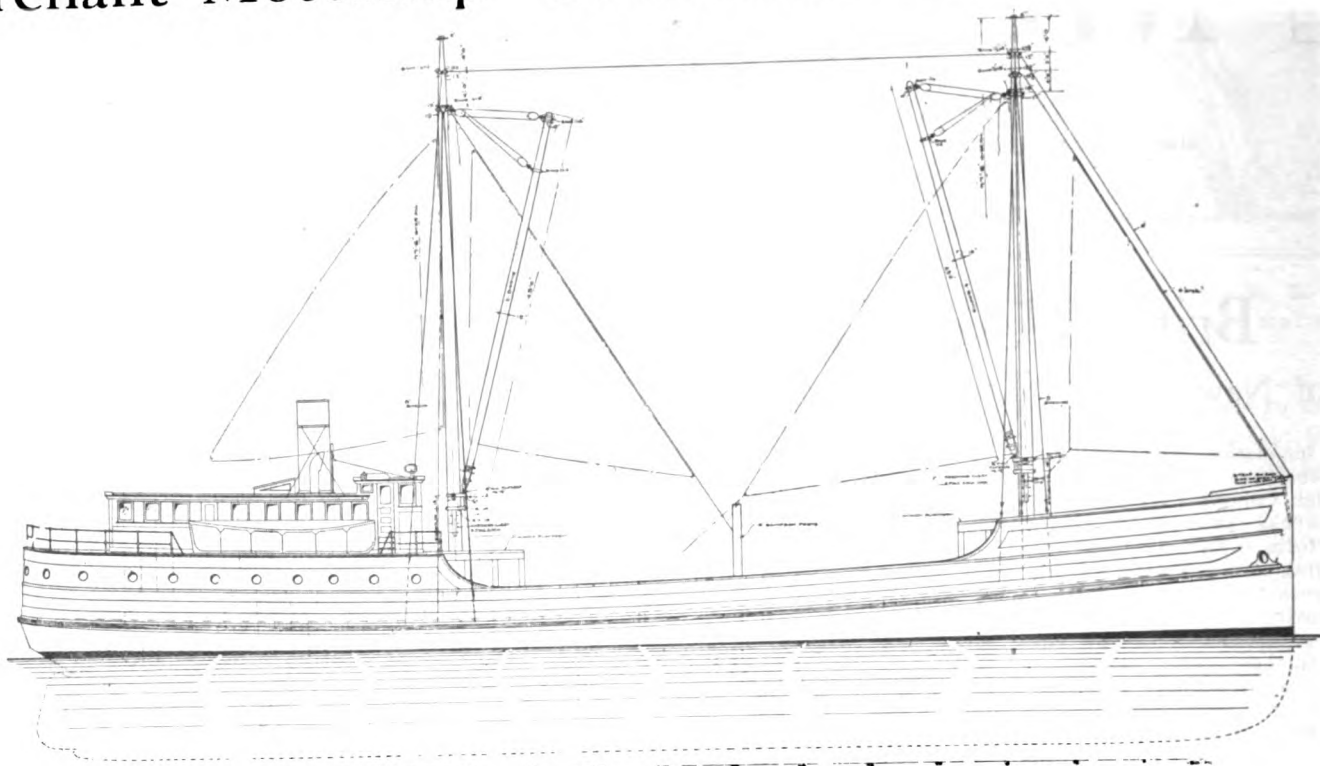
It was further stated that business prospects for the new company are bright. Inquiries have already been received from several places in Canada and Washington state. Among the Canadian list is one from St. John, N. B., all asking how soon the company can undertake to have ships ready for charter or purchase. Prospective business is the least of the company's concerns, and all signs indicate that within a year from now the inlet city will be a busy hive of shipbuilding industry. The site of the new enterprise will embrace a waterfrontage of 400 feet in length by 1100 feet in width, between Kyle and Queen streets. The work of driving 2000 piles and covering them with heavy sheeting to make the retaining wall will be commenced at once. The enclosed space will require 200,000 yards of fill, which will be dredged from the bed of Burrard Inlet directly in front of the site. This will also serve the purpose of providing access to deep water for ships built on the new slips.

Included in the plans for the new plant are foundations for three launching slips, built so as to afford facilities for the erection of two ships in each simultaneously. On these ways the company will, at the outset, build vessels of approximately 2000 tons, each with accommodation for 1,500,000 feet of lumber in their cargo space. The slips will be installed in such a manner as to provide for the construction of steel vessels up to 10,000 tons, when the price of steel declines, and the plant capacity, which is being designed with that object in view, will also comprise a complete machine shop, foundry and wood-working equipment.

The proposed plant will also contain two marine railways, one to handle bottoms up to 3000 tons, and on which the company would repair its own vessels, as well as carry on a general repair business.

The active management of the plant will be in the hands of Captain Harry Mowatt, late superintendent at Liverpool of the C. P. R. marine service, and who superintended the construction of the Empresses of Asia, Russia, Britain and Ireland, also the Princesses Charlotte, Mary, Alice, Adelaide, and other well known vessels in the C. P. R. service.

Merchant Motorship "Kuskokwim River" Launched



PLAN OF THE MOTOR FREIGHTER FOR THE WESTWARD NAVIGATION COMPANY.

The first of a considerable fleet of wooden motor ships now under construction on Puget Sound for various services was launched at the yards of Johnson Bros. & Blanchard of Seattle in the evening of April 22. The vessel, the "Kuskokwim River," was built for the Westward Navigation company to be used by them in their trade between Seattle and Bethel, a point on the Kuskokwim river 140 miles beyond Cape Newenham. She is 150 feet long, 35 feet beam, draws 13 feet and has a dead weight freight capacity of 700 tons.

Power will be furnished by two Meitz and Weiss heavy oil semi-Diesel engines driving twin screws and developing 150 h. p. each at 240 r. p. m. The engines are three cylinder, 14 inches diameter by 18½ inches stroke, air starting and directly reversible. It will take about \$20 worth of oil to run them for twenty-four hours, which makes her a very cheap vessel to operate especially considering the small crew necessary.

The two hatches are served by electric winches, power for which is supplied by a 22 k. w. generator run by a two cylinder 9x10 inch, Meitz & Weiss oil engine. Electric lights are connected to a 3½ k. w. generator run off one of the main engines and working in connection with a storage battery. The fuel tanks with a capacity of 20,000 gallons are located along side the engines and a 6,000 gallon fresh water tank is located forward.

The crew's quarters are in the forecabin. Provision is made there for six sailors. Aft in the poop and deck house are commodious quarters for the officers and a large wheel house. The quarters are heated by steam heat from an "Arco" coal burning boiler and hot and cold water are piped to all staterooms.

The vessel will carry one life boat and one power tender. The tender is equipped with a 14 h. p. Frisbee engine and is able to develop a speed of eleven and a half knots.

The mouth of the Kuskokwim river is well guarded by long and treacherous sand bars which account for the light draft of the motor ship. This river valley is one of the least developed sections of Alaska and the organization of the Westward Navigation Co. is the beginning of the opening of a large district. On the first trip of the vessel a gold dredge will be sent up and if it is successful more will follow. There is a big body of lignite coal in the valley besides one of the largest agricultural areas in the territory.

The Westward Navigation company is made up of John Graham, the well-known architect and yachtsman as president, and E. G. Shorrock, secretary and treasurer; Walter Tinn is general freight and passenger agent.

The boat was designed for Mr. Graham by L. E. Geary and no pains have been spared in having her built as staunch and comfortable as possible. When completed she will represent an investment of about \$70,000.

ORGANIZE TO BUILD LUMBER CARRIERS.

The Trans-Pacific Marine company, with a capital stock of \$250,000, has been organized with J. H. Bloedel, of the Bloedel-Donovan Lumber company; J. A. Kerr, A. F. Anderson and J. W. Maxwell, of Seattle, and J. J. Donovan, of Bellingham, as trustees to build and operate a fleet of motor schooners in the lumber trade.

Three vessels, each to cost from \$150,000 to \$175,000, are to be built in the near future at local yards for use in the coastwise and through-the-canal trade. They will be from three to five-masters and will be powered with two 300-h. p. Diesel or semi-Diesel motors. The ships will be for cargo only and will carry from 1,500,000 to 2,000,000 feet of lumber.

The company has been organized on the belief that wooden vessels properly built and powered with heavy oil engines will be a paying proposition in the lumber trade. There has always been a scarcity of bottoms here for lumber shipments and if there are a great number of ships released at the end of the war the Bloedel-Donovan mills alone can furnish cargoes for the vessels which the new company is to build.

The company is still somewhat at sea regarding its plans and their possible maturity, but it is understood that competitive plans are being submitted by three Seattle naval architects and that an effort is being made to lease a prominent Puget Sound wooden ship building yard.

As far as can be gathered orders have not yet been placed for the engines which will be required.

SHIPYARD UNDER CONSTRUCTION.

The J. A. McEachern & company have established a plant in Astoria, Oregon, at the foot of Seventh street, in which to build power schooners for the general cargo trade. W. W. Clark, general manager of the company, is driving the work on the plant to a rapid completion and the keel of the first vessel will soon be laid.

Five hundred piles were driven for the ways for the first ship and two other ways will be built as fast as possible. The mold loft, 50x100 feet, has been completed, as have the mill, power plant, steam boxes, office and draughting room. The machinery of the plant will be electrically driven and the power company is installing its high tension station to supply the electricity.

The shops and mill have been built on the upland and the ways run out into deep water about three hundred feet beyond the harbor line. The shore at this point is about twenty-five feet above the water, so that the site is an admirable one for the plant and the ways get just the right slope into deep water.

The mill has been arranged to the point of highest efficiency, the logs coming in at one end

and the pieces for ships going out completed at the other. Step follows step in the handling, from the log chute to the steam box no motion is lost in getting the finished product ready to place in the ship. Mr. Clark expects to put 100 men at work on each vessel so everything points to the early completion of the ships.

The plans of the ships have been completed by Joseph A. Sloan, of Seattle, and provide for a four-masted schooner equipped with two 240-h. p. direct-reversible Skandia semi-Diesel crude oil engines, driving twin screws. The vessels are 250 feet over all, 220 long on the keel, 43 feet moulded beam and 21 feet moulded depth. There are three large hatches, each fitted with two double electric winches. The anchor hoist is also electrically driven. The electric power is generated by a 40-h. p. crude oil Skandia engine which also drives a centrifugal pump for fire and water service and a small air compressor.

Two fuel oil tanks are fitted on deck in the after end of the forecabin and one on each side of the engine room. Fuel oil will be carried to give a cruising radius of about 7000 miles. One hundred and sixty barrels of fresh water is carried in tanks located in the bow. Crew's quarters are fitted in the forecabin and officers' quarters in the poop as is usual in this type of vessel.

SKANDIAS FOR SWAYNE & HOYT.

Swayne & Hoyt Co., of San Francisco, have contracted with the Pacific Coast Agency for two 240 h. p. Skandia engines for a schooner now building at Coos Bay, Oregon. These engines are now on their way from Sweden and should arrive in about 40 days.

ANOTHER AUXILIARY LUMBER CARRIER.

A lumber schooner with a capacity of 650,000 feet will be built at the St. Helens yards for the California & Oregon Lumber company of Brookings, near Crescent City, Cal. The vessel is to be completed in eight months and will cost \$135,000, it is announced today. It will run between Brookings and San Francisco. The ship will be driven by Bolinder engines and will be equipped with a steel cargo rig recently patented by Ernest Hough, marine architect of San Francisco.

TECHNICAL ARTICLES ON CONSTRUCTION
AND OPERATION OF COMMERCIAL
MOTOR VESSELS SOLICITED BY

MOTORSHIP

Pacific Coast 1916 Motorship Construction at a Glance

OWNER	VESSELS	Engines Number	Each H. P.	Make Engines	YARD	STATUS
Chas. McCormick & Co.	Aux. sch. City of Portland	2	160	Polinders	St. Helens Shipbuilding Co.	Launched April 18th
Chas. McCormick & Co.	Aux. sch. City of Astoria	2	160	Polinders	St. Helens Shipbuilding Co.	Under construction
Chas. McCormick & Co.	Aux. sch. unnamed	2	160	Polinders	St. Helens Shipbuilding Co.	Under construction
Atkins, Kroll & Co.	Aux. sch. unnamed	1	80	Union	Wm. Brosstar	Under construction
Westward Nav. Co.	M. S. Kuskokwim River	2	150	Mietz & Weiss	Johnson Bros. & Blanchard	Completed May 23rd
Swayne & Hoyt	M. S. unnamed	2	350	Sumner	Grays Hbr. Shipbuilding Co.	Under construction
Swayne & Hoyt	M. S. unnamed	2	350	Undecided	Grays Hbr. Shipbuilding Co.	Under construction
Swayne & Hoyt	M. S. unnamed	2	350	Undecided	Grays Hbr. Shipbuilding Co.	Under construction
Swayne & Hoyt	M. S. unnamed	2	350	Undecided	Grays Hbr. Shipbuilding Co.	Under construction
Port of Seattle	Ferry	1	200	Mietz & Weiss	United Eng. Works	Installation completed
County of King	Ferry	1	225	Southwark-Harris	J. F. Duthie & Co.	Under construction
Hansen & Hufner	Ferry	1	250	Atlas Diesel	McAteer Shipbuilding Co.	Under construction
San Juan Fishg. & Pkg. Co.	Ferry	1	60	Mietz & Weiss	Ward & Son	Under construction
B. C. Sulphite Co.	Sch. Comet	1	225	Southwark-Harris	Not determined	Bids called for
B. C. Sulphite Co.	Aux. schooner	1	350	Semi-Diesel	Not determined	Bids called for
B. C. Sulphite Co.	Aux. schooner	1	350	Semi-Diesel	Not determined	Bids called for
B. C. Sulphite Co.	Aux. schooner	1	350	Semi-Diesel	Not determined	Projected
B. C. Sulphite Co.	Aux. schooner	1	350	Semi-Diesel	Not determined	Projected
B. C. Sulphite Co.	Aux. schooner	1	350	Semi-Diesel	Not determined	Projected
B. C. Sulphite Co.	Aux. schooner	1	350	Semi-Diesel	Not determined	Projected
B. C. Sulphite Co.	Aux. schooner	1	350	Semi-Diesel	Not determined	Projected
B. C. Sulphite Co.	Aux. schooner	1	350	Semi-Diesel	Not determined	Projected
B. C. Sulphite Co.	Aux. schooner	1	350	Semi-Diesel	Not determined	Projected
Boyd's, Ltd.	Aux. schooner	1	350	Semi-Diesel	Not determined	Projected
Boyd's, Ltd.	Aux. schooner	1	350	Semi-Diesel	Not determined	Projected
Matson Nav. Co.	Hk. Annie Johnson	2	160	Polinders	Boyd's, Ltd.	Under construction
Matson Nav. Co.	Hk. R. P. Rethet	2	160	Polinders	Union Iron Works	Installation completed
A. F. Mahoney	Aux. schooner	2	160	Polinders	Union Iron Works	Installation begins soon
A. F. Mahoney	Aux. schooner	2	160	Polinders	James Robinson	Under construction
A. F. Mahoney	Aux. schooner	2	160	Polinders	James Robinson	Under construction
A. F. Mahoney	Aux. schooner	2	160	Polinders	James Robinson	Under construction
R. Liebes & Co.	Whaler Herman	1	250	Atlas	Atlas Gas Eng. Works	Completed
E. K. Wood Lumber Co.	Aux. schooner	2	240	Skandia	Plans being drawn	
Angelo Farce Co., Callao	Sch. Terza Italia	1	125	Skandia	Schultze, Robinson & Schultze	Under construction
Emanuel Rouzier	Sch. Ysabel May	1	80	Union	Union Gas Eng. Co.	Completed
Frank B. Peterson	Frank B.	1	150	Union	W. F. Stone	Completed
Mexican interests	Sch. Hugh Hogan	1	250	Diesel	Installation planned	
Alaska Pacific Nav. Co.	Motorship unnamed	2	625	Southwark-Harris	Alaska Pac. Nav. Co.	Under construction
Alaska Pacific Nav. Co.	Motorship unnamed	2	625	Undecided	Alaska Pac. Nav. Co.	To be built
Alaska Pacific Nav. Co.	Motorship unnamed	2	625	Undecided	Alaska Pac. Nav. Co.	To be built
Alaska Pacific Nav. Co.	Motorship unnamed	2	625	Undecided	Alaska Pac. Nav. Co.	To be built
Alaska Pacific Nav. Co.	Motorship unnamed	2	625	Undecided	Alaska Pac. Nav. Co.	To be built
Alaska Pacific Nav. Co.	Motorship unnamed	2	625	Undecided	Alaska Pac. Nav. Co.	To be built
Washington Shipping Corp.	Aux. schooner unnamed	2	240	Mietz & Weiss	Washington Shipping Corp.	Under construction
Washington Shipping Corp.	Aux. schooner unnamed	2	240	Mietz & Weiss	Washington Shipping Corp.	Under construction
Washington Shipping Corp.	Aux. schooner unnamed	2	240	Mietz & Weiss	Washington Shipping Corp.	Construction begins in 60 days
Washington Shipping Corp.	Aux. schooner unnamed	2	240	Mietz & Weiss	Washington Shipping Corp.	Construction begins in 60 days
Washington Shipping Corp.	Aux. schooner unnamed	2	240	Mietz & Weiss	Washington Shipping Corp.	To be built
Washington Shipping Corp.	Aux. schooner unnamed	2	240	Mietz & Weiss	Washington Shipping Corp.	To be built
Washington Shipping Corp.	Aux. schooner unnamed	2	240	Mietz & Weiss	Washington Shipping Corp.	To be built
Washington Shipping Corp.	Aux. schooner unnamed	2	240	Mietz & Weiss	Washington Shipping Corp.	To be built
Washington Shipping Corp.	Aux. schooner unnamed	2	240	Mietz & Weiss	Washington Shipping Corp.	To be built
Washington Shipping Corp.	Aux. schooner unnamed	2	240	Mietz & Weiss	Washington Shipping Corp.	To be built
Washington Shipping Corp.	Aux. schooner unnamed	2	240	Mietz & Weiss	Washington Shipping Corp.	To be built
Washington Shipping Corp.	Aux. schooner unnamed	2	240	Mietz & Weiss	Washington Shipping Corp.	To be built
Trans-Pacific Marine Co.	Aux. schooner unnamed	2	300	Diesel or Hot bulb	Trans-Pacific Marine Co.	To be built
Trans-Pacific Marine Co.	Aux. schooner unnamed	2	300	Diesel or Hot bulb	Trans-Pacific Marine Co.	To be built
Trans-Pacific Marine Co.	Aux. schooner unnamed	2	300	Diesel or Hot bulb	Trans-Pacific Marine Co.	To be built
J. A. McEchern & Co.	Aux. schooner unnamed	2	240	Skandia	McEchern & Co.	Under construction
J. A. McEchern & Co.	Aux. schooner unnamed	2	240	Skandia	McEchern & Co.	Under construction
J. A. McEchern & Co.	Aux. schooner unnamed	2	240	Skandia	McEchern & Co.	Under construction
Capt. W. Wrightson	Aux. schooner unnamed	2	240	Skandia	McEchern & Co.	Under construction
Porden & Lane	Aux. sch. Great Bear	1	160	Polinders	St. Helens Shipbuilding Co.	Under construction
Honolulu Iron Works	Aux. schooner unnamed	1	320	Polinders	Honolulu Iron Works	Under construction
Shell Oil Co. of Cal.	Motor tank ship No. 1	1	320	Polinders	Honolulu Iron Works	Under construction
E. K. Wood Lumber Co.	Motorship unnamed	2	320	Polinders	Mathews Shipyards	Under construction
(A) Babare Bros.	Schooner Oregon	2	160	Undecided	Babare Bros.	Under construction
W. A. Lowman	Tender Coast	1	120	Niseco	W. A. Lowman	Under construction
Peninsula Shipbuilding Co.	Aux. schooner unnamed	2	240	Undecided	Peninsula Shipbuilding Co.	Plans being drawn
Peninsula Shipbuilding Co.	Aux. schooner unnamed	2	240	Undecided	Peninsula Shipbuilding Co.	Plans being drawn
Peninsula Shipbuilding Co.	Aux. schooner unnamed	2	240	Undecided	Peninsula Shipbuilding Co.	Plans being drawn
Cal. & Ore. Lumber Co.	Aux. schooner unnamed	2	240	Undecided	Peninsula Shipbuilding Co.	Plans being drawn
		2	160	Polinders	St. Helens Shipbuilding Co.	Under construction

* Not a new vessel.

(A) Not definitely decided to install power yet.

TWO NEW DRY DOCKS FOR SEATTLE.

The enormous increase in Seattle shipping has forced J. F. Duthie & Co., with yards on the East waterway, and the Ballard Marine Railway Co., to each add to their equipment a large floating drydock, the work on both the docks to be begun sometime this month. No better proof is needed of the importance of Seattle as a shipping center or of the prosperity which the shipbuilders are now enjoying.

The dock for the Duthie yard will cost \$200,000. The material has all been ordered and the plant has begun work on the patterns for the valves and pumps. The dock will be 340 feet in length and 95 feet in width. It will be capable of taking ships of 5000 tons and will be of the Donnelly type with continuous walls and a pontoon bottom.

This type of dock was designed by W. T. Donnelly of New York. He also designed the Prince Rupert and Honolulu docks, both of which are giving the best of satisfaction, and a large number of docks in other ports. It is expected to have the new dock ready for operation in about five months.

The Ballard Marine railway have had the construction of a drydock under consideration for some time. They approved the plans for the new dock on May 6th and are now busy getting prices on lumber and machinery. With the completion of the government lock and the Port of Seattle Fisherman's dock Ballard will undoubtedly come to the front as a shipbuilding center and the marine railway people have all the work they can handle.

REMINGTON SALES AGENCY ESTABLISHED FOR PACIFIC.

The General Engineering & Sales company has been formed at Seattle to handle the sales of the well known Remington oil engine in Washington, Oregon, British Columbia and Alaska, and plans will be immediately formulated for the establishment of local sub agencies at the various important points in that territory.

The new company is composed of T. J. Stewart, president; Allen B. Stroud, treasurer, and F. H. Stroud, sales manager. Offices have been opened in the Colman building, Seattle. Later on an engineer will be added to the staff of the concern which expects to do a wide general business in both marine and stationery types in all sizes.

The Remington Oil Engine company is one of the best known organizations in the business and has been producing oil engines for more than twelve years. Its officers point with pride, quite justly, at the fact that over 2,000 Remington engines are in operation and that its sales have covered thirty-nine different foreign countries.

The current boom in marine construction finds the Remington company well prepared, as it has a modern factory at Stamford, Conn., and central offices in New York city. The closing of the deal with the General Engineering & Sales company is the last link in completing its plans for American distribution.

The Remington engine is the work of Winthrop A. Clark and its design accordingly presents some very interesting features. We quote from a recent circular:

The first important improvement was on the oil spray nozzle. This has been provided with a water jacket which keeps the fuel cool until after it passes through the nozzle tip in a vertical direction, and is thereby atomized into the head. Keeping the oil cool until it passes out of the nozzle prevents the decomposition of the oil within the nozzle itself, and the deposit of carbon, which formerly made frequent cleaning a necessity. The danger from carbon deposit has been done away with entirely.

A new blow torch (or lamp) built for heating the heads, has been adopted. It uses compressed air at any pressure between 20 and 100 pounds per square inch. This torch is intended more especially for marine use on engines having a cylinder bore of 7 inches and more.

A new governor has been designed, built and

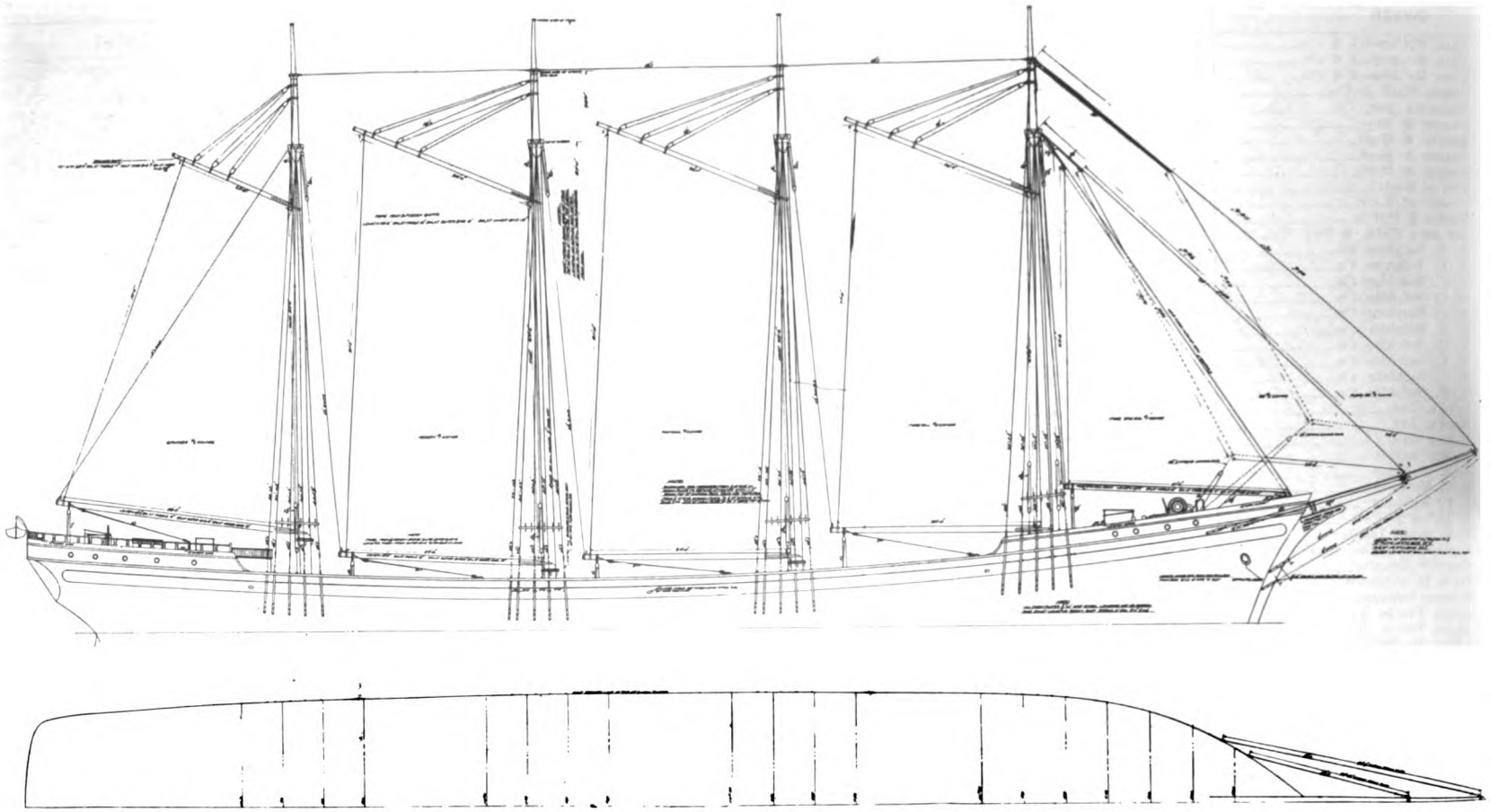
tested, to meet the demand for very close regulation on electric lighting loads.

A new crank pin oil ring has been designed, made in two parts to facilitate the assembling and removing of this ring in case of necessity, without removing the shaft of the engine on multiple cylinder engines as formerly. The ring can thus be removed by simply taking out part of the middle end plate of a multiple cylinder engine. This is a great advantage over the old system, where the engine had to be disassembled in case an oil ring should be damaged, and it was necessary to replace a new one.

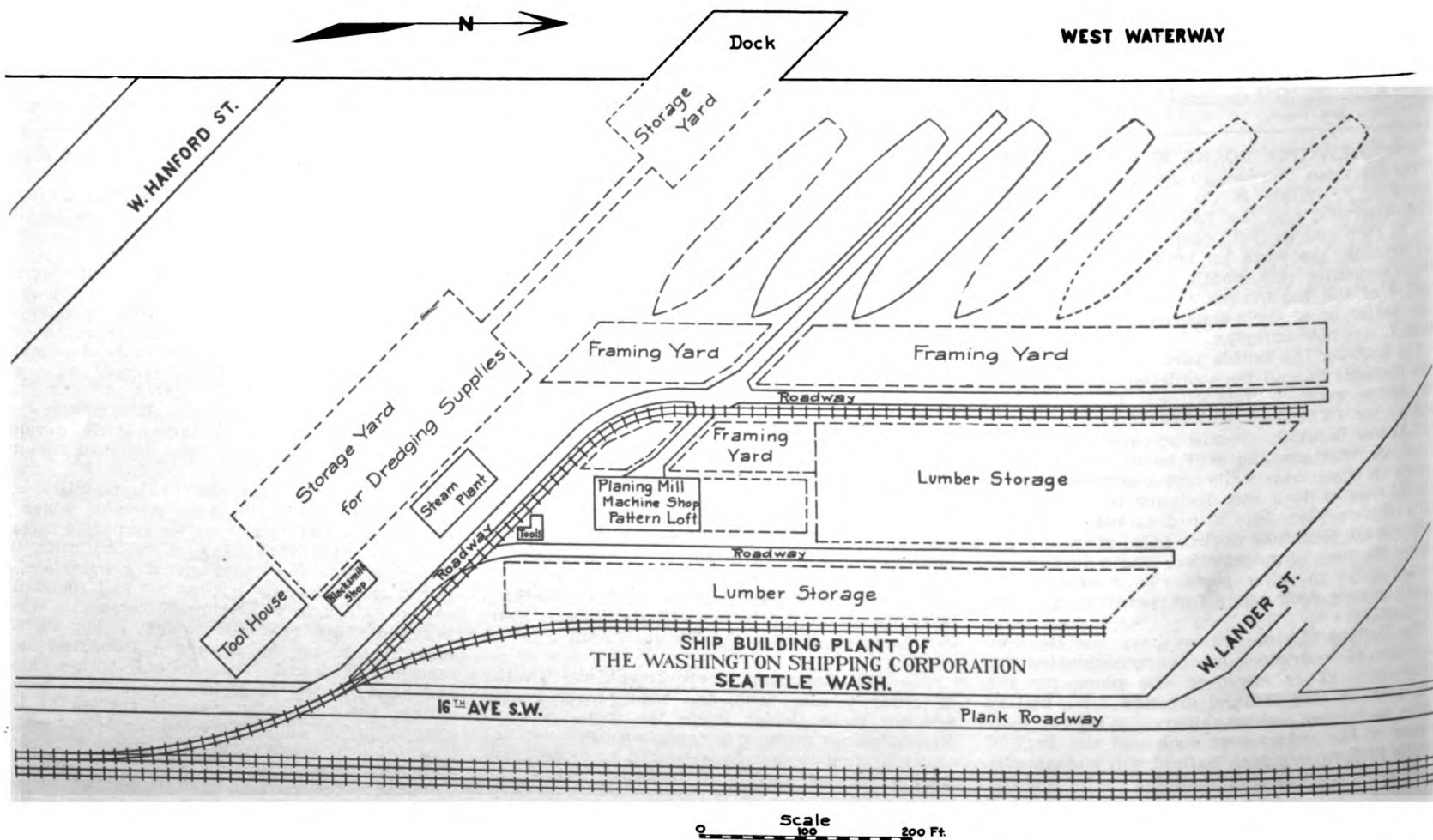
Not the least important result that our engineering department has obtained is the development of a new form of head designed to burn low grade oils.

The new type heavy oil head vaporizes and burns heavy oils, following a principle which is entirely new and which reverses entirely a certain popularly fixed idea. Instead of injecting the heavy oil into the head against a hot plate, it is projected violently against a small round flat surface which is very thoroughly cooled. When heavy oils are projected against a hot surface the oil is broken up, leaving a deposit of hard carbon which can be removed only with a chisel and hammer. By projecting it against a cooled surface the oil is atomized and gasified by the temperature of the compressed air before it begins to burn. When combustion occurs it is complete, leaving no carbon deposit.

We have collected and tested a great variety of low grade oils from all parts of the United States and from Mexico, Russia and other countries. These oils have various names, such as "Gas oil," "Stove and Star oil," "Fuel oil," "Distillate," etc. They vary considerably in gravity and fire tests. The tests showed that by using the new type heavy oil head the Remington Oil Engine will operate successfully on any of these oils. Oils which are entirely suitable can be found almost everywhere in the United States, Mexico and all other countries.



PLANS FROM WHICH WASHINGTON SHIPPING CORPORATION WILL BUILD.



PLAN OF WASHINGTON SHIPPING CORPORATION'S SHIPYARD AT SEATTLE.

New Company Will Build Twelve Merchant Motorships



S. H. HEDGES, President.



BERT FARRAR, Trustee.



J. E. CHILBERG, Treasurer.



R. R. FOX, Secretary.

In the name of the Washington Shipping Corporation ground was broken in Seattle early this month for what will prove to be when completed the largest wooden shipbuilding plant on the Pacific Coast. The keels of two auxiliary power schooners have been laid, two more will be started within the next sixty days and the new concern's immediate plans call for the construction of twelve vessels. The enterprise is destined to become a permanent one and its operations will be governed only by the extent to which conditions will in the future limit expansion in the American Merchant Marine.

The company has been incorporated with a capitalization of \$250,000 and will be headed, as president, by Samuel H. Hedges, a Seattle capitalist also president of the Puget Sound Dredging Co., which has completed a great many public and private projects of the greatest importance. Frank E. Burns, a well known steamship man, for years associated with the Alaska Steamship Co., and at present in charge of the operating phase of the Inland Navigation Co. will act as vice-president. J. E. Chilberg, president of the Scandinavian-American Bank and a leading Seattle financier, will act as treasurer while R. R. Fox, Seattle manager of the Simmonds Manufacturing Co., will act as secretary. These four together with Bert Farrar, a prominent Seattle real estate man will constitute the trustee board of the corporation.

A shipyard is being laid out on a very comprehensive scale, as may be gathered from the accompanying illustrations, on 24 acres of land leased from the Puget Sound Bridge & Dredging Co., and located on the Seattle waterfront not far from the plant of the Seattle Construction and Drydock Co. The completeness of the equipment which will here be provided will make it practical for the company to carry on a general wooden shipbuilding business in addition to turning out the vessels which it will build on its own account. This policy has been adopted by the trustees and after operating costs in this location have been determined the Washington Shipping corporation will bid on current work.

All materials and machinery for the first four vessels have been ordered. They will be of the auxiliary schooner type, 252 feet long and of 2500 tons. Cargo space is being so arranged as to give a capacity of 1,500,000 b.m. feet of lumber. The boats will each be equipped with twin 240 h. p. Mietz & Weiss oil engines of the latest model. These engines are now being manufactured in New York at the plant of the August Mietz Machine Works.

Work will be pressed forward to completion as far as possible in order to take the fullest advantage of the current high rates on ocean tonnage. The first two boats will be launched in November and will go into commission on the following month. They have been chartered for January loading at a very attractive figure.

These vessels are to be built from the designs of Joseph Sloan of the Puget Sound Bridge & Dredging Co.

BENICIA SHIP PLANT RESUMES.

The old shipbuilding plant of Matthew Turner at Benicia, Cal., has been taken over by James Robinson, and will be started up again at once. Mr. Robinson has taken an order for the con-

struction of three power schooners for the lumber trade, for Andrew F. Mahony, a prominent San Francisco lumber and shipping man. The new vessels will be built on the same lines, rigged as four-masted bald-headed schooners, each having a pair of twin 160-h. p. Bolinder engines. They will have a capacity for 1,500,000 feet of lumber each, and will be 212 feet long over all, 42 feet 6 inches wide, with 19 feet depth of hold. It is reported that the vessels will cost \$150,000 each, and will be completed within eleven months. The Turner plant was at one time one of the largest shipyards on the bay, and built a great many wooden vessels, including a number for the Alaska trade.

UNION GAS ENGINE COMPANY TAKES DIESEL ENGINE AGENCY.

Owing to the rapidly increasing demand for a marine engine of the crude-oil burning type, the Union Gas Engine company, which has heretofore confined its attention to gasoline or distillate engines, has just taken up the coast agency for the Skandia direct-reversible semi-Diesel engines. The company regards this as the most improved Diesel engine made in America, and is prepared to get behind it in an energetic manner.

SKANDIA'S FOR LUMBER CARRIERS.

The E. K. Wood Lumber company, of San Francisco, is having plans prepared for an oil-propelled lumber schooner, to have a capacity of 700,000 feet of lumber, and has placed an order with J. H. Hansen & company for twin 240-h. p. Skandia direct-reversible Diesel engines. The dimensions of the vessel have not been determined, but she will be built of wood at Hoquiam, Wash. Her equipment will also include an 8 and a 15-h. p. Skandia engine for electric light and general power.

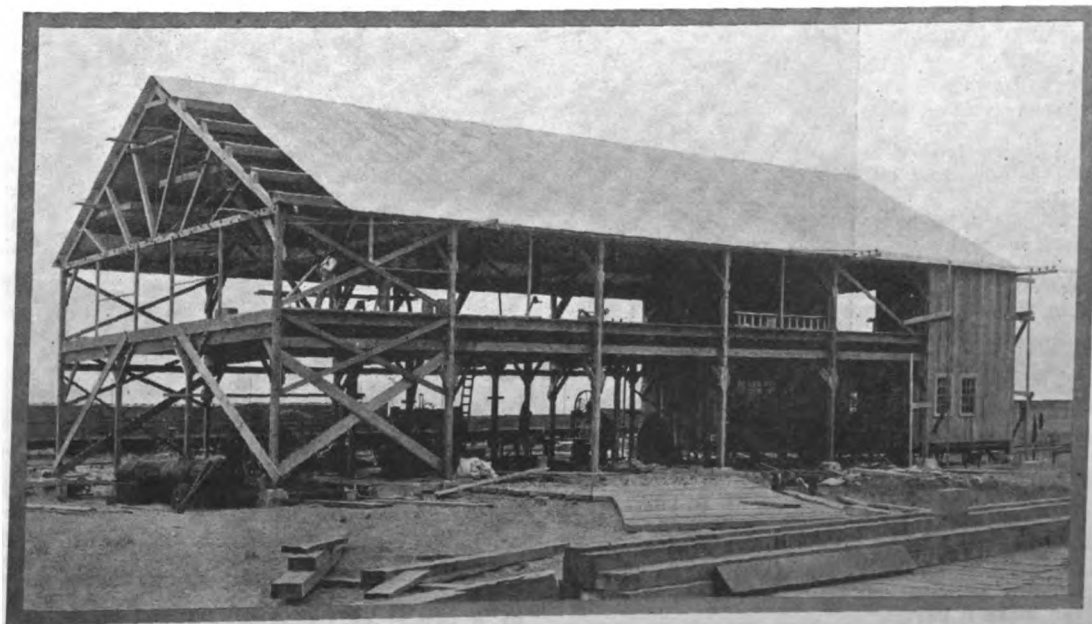
The 125-h. p. Skandia Diesel engine for the

Terza Italia is expected to arrive about the first of June, being now on the way by the Panama Canal. This boat is being built for the Angelo Farce company, of Callao, for freight and towing in the wine trade along the Peruvian coast. Schulze, Robinson & Schulze, the builders, expect to have her ready for installation when the engine arrives, and she will be taken south by Aristide Papa, head of the wine company.

NEW ENGINE FOR OLD WHALER.

The old whaler Herman, of H. Liebes & company, has just left the plant of the Atlas Gas Engine Works, where she was completely overhauled and equipped with a 250-h. p. gasoline engine, which replaces an old steam plant which took her on many Arctic voyages. She was also re-rigged as a three-masted schooner. Her trial trip was made April 17, and she attained a speed of 9 knots. The trial was attended by fifty guests, and included a trip up the bay to Red Rock and outside the heads to the lightship, both sails and engine being thoroughly tested. Later an elaborate luncheon was served on board. She behaved splendidly throughout the trip, and with her new fittings she does not show her age of thirty years; and those who have been working on her say she is perfectly sound inside and out, and has a long period of usefulness still ahead. The owners intend to use her in trading with their fur stations in Alaska, and will start her out about May 1 with a full cargo of trading goods and supplies.

The Herman was built at Bath, Me., and for many years bore the name of Morning Star, being used as a missionary boat among the south sea islands. She was later bought by her present owners, who used her for a steam whaler and trader, but has been lying in the mud of Oakland harbor for some time. She is 132 feet long, 29 feet 9 inches beam and 12 feet deep, of 410 tons gross displacement.



BEGINNING CONSTRUCTION OF PLANT FOR WASHINGTON SHIPPING CORPORATION.

Skinner-Eddy Shipyard Well Under Way

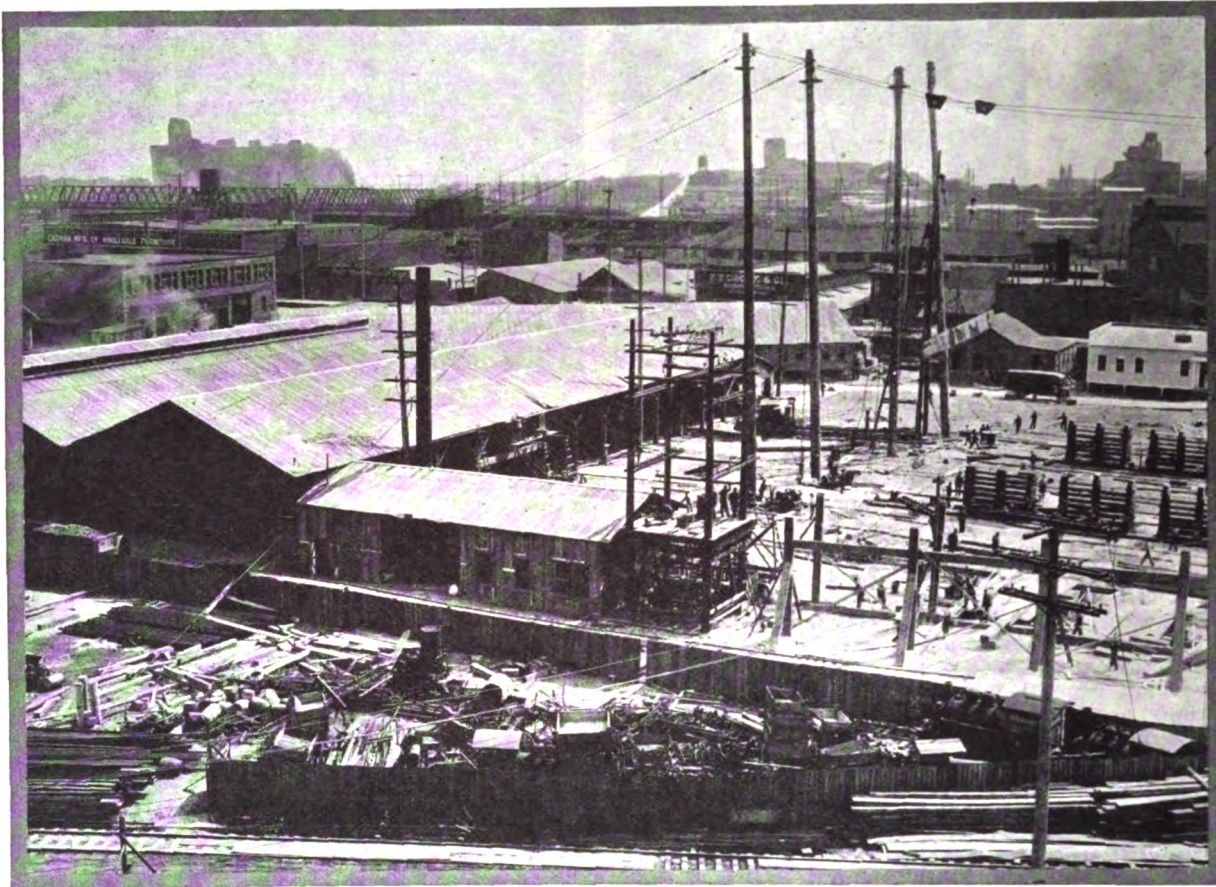
The Skinner-Eddy Corporation, organized by D. E. Skinner and J. W. Eddy, owners of the Port Blakeley mills, is building six steel steamships at their new plant on the East Waterway and Massachusetts street in Seattle. Four of the ships, two oil tankers and a freighter, have already been sold and the other two are not sold by the time they are completed the com-

Jennette Skinner and Ethel Eddy. While these two boats are being completed on the two ways which have been built a third slip will be constructed on which one of the oil tankers will be laid down. The second oil tanker will be built on the ways of one of the freighters which are expected to be in the water within ninety days after their keels are laid. The fifth and sixth

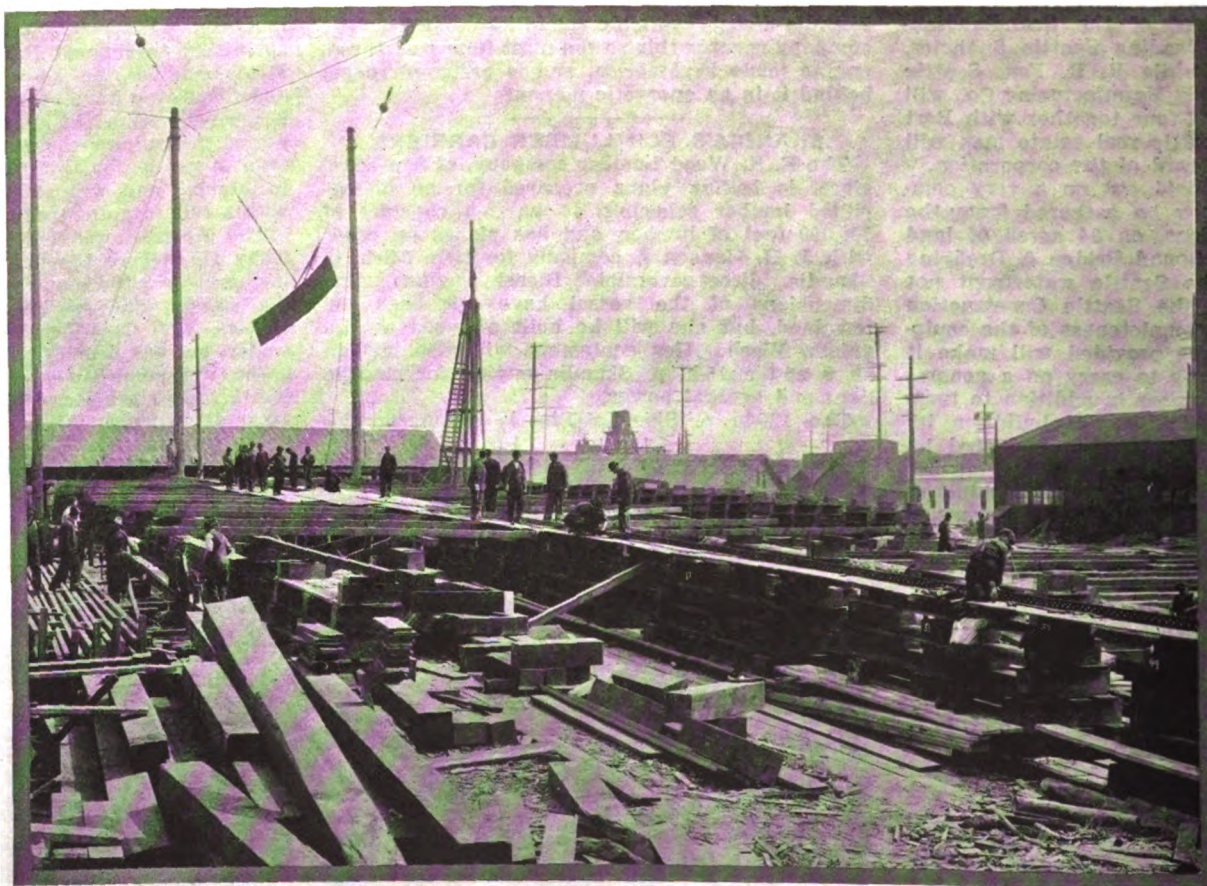
heaters. Electric lights will be fitted throughout.

The two freighters are 423 feet 9 inches long over all, 54 feet moulded beam and 29 feet 9 inches moulded depth. Their dead weight is 8,800 tons and they will have a sea speed of ten and one-half knots.

The vessels are steel, single screw cargo steamers of the poop, bridge and forecastle type



GENERAL VIEW OF SKINNER-EDDY YARDS AT SEATTLE.



LAYING KEEL FOR THE "JEANETTE SKINNER" AND PLACING BLOCKS FOR THE "ETHEL EDDY"

pany will operate them carrying their own lumber, or in whatever line appears to be most profitable. The Eddy family and Mr. Skinner have been in the lumber and carrying trade on the Great Lakes for many years and are in the ship-building business here to stay as long as they can make it pay.

The first two ships now laid down are the

boats will be freighters of the same size and type as the first and second.

The propelling machinery will be the same for all of the boats and will consist of one set of Curtis turbines, with reversing turbine built in the same casing, connected to the propeller shaft by a two stage reduction gear. There will be three Scotch marine boilers fitted with super-

with machinery amidships. There will be two steel masts with four five ton and one 30 ton cargo boom on each mast, and two derrick posts each fitted with one three ton cargo boom. There will be four large and one small cargo hatch through the upper and second decks.

Wide spaced hold pillars are fitted, arranged

(Continued on Page 24)

Seattle Company Will Build Six Motorships

The first of six large wooden hull, ocean going motorships is about to be laid down at the new yard of the Alaska Pacific Navigation company on the west side of the West Waterway in Seattle. The boats were designed and will be built under the supervision of R. M. Semmes, former general freight and passenger agent of the Pacific Alaska Navigation Co., and now vice-president and general manager of the new concern. The president of the company is Charles A. Burckhardt, president of the Cotton-Burckhardt Co. and the Alaska Pacific Fisheries Co., and J. M. Elliott of Elliott Bros., Inc., is secretary and treasurer.

The company will operate their boats wherever they find that trade conditions will warrant their doing so. The boats are designed to enter both the freight and passenger traffic and no effort will be spared in equipping them for the service. Approximately 850,000 feet of high grade lumber will be used in their construction and the work on them will be rushed.

The plans call for a boat 237 feet long over all, 42 feet beam, 23 feet moulded depth and 2250 measured tons under decks. Including the deck load they will have a lumber capacity of a million and a half feet.

Power will be supplied by two 625 h. p. Southwark-Harris Diesel engines and all of the auxiliaries will be electrically driven. Fuel will be carried in a large tank forward of the engine room to give a power radius of about 8000 miles. Two hatches, each 16x22 feet, will provide for



LAYING KEEL FOR FIRST VESSEL AT ALASKA PACIFIC NAVIGATION CO. YARD.

house, while the sailors will be located in the forecabin where provision is made for thirty-three steerage passengers. The new boats will cost \$150,000 complete and the first one is expected to be in the water within six months.

One 360 i.h.p. engine to be installed in a double-end ferryboat, for the Port Commissioners of Seattle.

One 360 i.h.p. engine for the San Juan Fish



C. A. BURCKHARDT, Pres.
A. P. Nav. Company.

WILL INSTALL DIESEL IN TRADER.

The three-masted schooner Hugh Hogan, which had trouble in Oriental waters and crossed the ocean with a jury rudder, and has had various minor difficulties since reaching port, has been purchased by Mexican interests and is being fitted out for the merchandise trade along the south coast. The Hugh Hogan was last year a member of the salt salmon fleet. She is now at Stone's shipyard for a thorough overhauling and extensive repairs, and will be re-rigged with a high-power engine. The make of engine has not been definitely determined, but the owners have been looking over the various Diesel types and will probably buy an engine of this kind. The Hugh Hogan is 175 by 40 feet, and draws about 10 feet of water.

SOUTHWARK-HARRIS SALES.

The Standard Gas Engine company, just recently appointed Pacific Coast distributors for the Southwark-Harris valveless oil engines, announces that they have already booked orders through the Pacific Net & Twine Co., their Seattle agents and also directly for six of these engines for use on this Coast, as follows:

One 225 i.h.p. engine for the McDonald Weist Lumber Co., to be installed in a tugboat for use on Puget Sound.



R. M. SEMMES, Gen. Mgr.
A. P. Nav. Company.

& Packing Co. to be installed in their schooner Comet, originally equipped with a distillate engine.

Two 625 i.h.p. engines for a twin-screw installation in a vessel being built at Nelson & Kelez Shipyard, Seattle, Wash., for the Alaska-Pacific Navigation company.

One 240 i.h.p. engine to be installed in a tow boat at this port.

In addition to the above, the Southwark Foundry & Machine company have recently secured orders for the following:

One 450 i.h.p. engine for a tow boat being built for the Pennsylvania Railroad company for use in New York harbor.

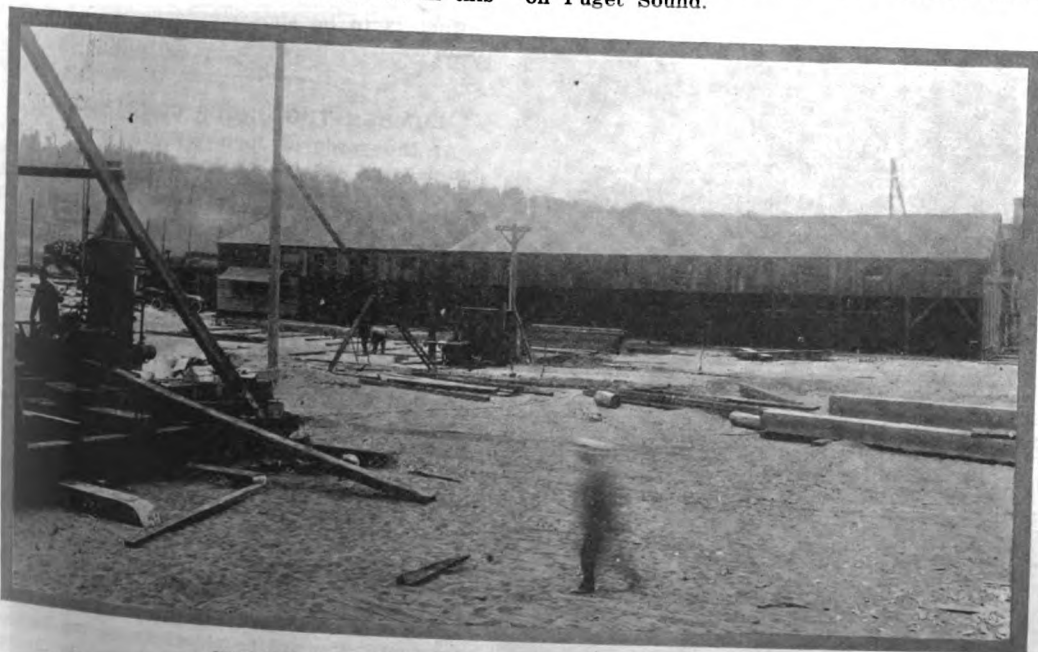
Two 480 i.h.p. engines for Frederick E. Lewis, New York City, to be installed in a 140-foot yacht being built by Luders.

Two 800 i.h.p. engines for the Texas company, to be installed in the Edward Sewell, sister ship of the Wm. P. Frye.

Two 360 i.h.p. engines for a new boat to be built for the Texas company, April 6, 1916.

MOTOR FREIGHTER FOR PUGET SOUND.

The Navy Yard Route company, H. B. Kennedy, president, is about to call for bids on a power freight carrying vessel to be used on the Navy Yard run. The new boat will be 80 feet long, 22 feet beam and will be equipped with 80-h. p. Fairbanks semi-Diesel engines. She will cost about \$20,000 and will be put into service as soon as she can be finished.



GENERAL VIEW ALASKA PACIFIC NAVIGATION CO. YARD.

"ANNIE JOHNSON" RETURNS TO SERVICE AS MOTORSHIP.

The four masted iron schooner "Annie Johnson" went back into commission at San Francisco recently after having been equipped with auxiliary power for her owners, the Matson Navigation company.

She is one of the first of the old-time vessels of her type to be fitted out along modern lines on this coast, and the results of her trial trip make interesting reading for those who are following the new trend of marine transportation.

The "Annie Johnson" was built in 1872 by Messrs. Williamson at Harrington in England. Gross tonnage 1049, underdeck tonnage 977, length 212 feet 1 inch, breadth 34 feet 1 inch, depth 21 feet 6 inches. She belongs to that fine type of iron ship whose record for staunchness and good condition, after long years of service, has been proverbial, and this fact has induced the owners to increase the earning capacity by installing auxiliary power, which has enabled them to shorten the time of voyage to a considerable extent.

The propulsive power of the "Annie Johnson" consists of two Bolinder fuel oil engines of the Model E. L. type, direct reversible, driving twin screws, each of the propellers being three bladed, diameter 6 feet, pitch 4 feet 1½ inches. The engines are designed for a speed of 225 revolutions per minute, and are placed as far aft as possible, a very small fraction of the cargo space being used for the engine room. The oil fuel is carried in a deep tank under the engine room and has a capacity of 420 barrels; sufficient for 40 days running. The day tanks are placed aft in the engine room, the day fuel oil tank having a capacity of 800 gallons, and fresh water day tank of the same capacity. There is also placed on the Starboard side one kerosene tank of 150 gallons, and one lubricating oil tank of 400 gallons. There are two air tanks placed on the port side of the engine, having a capacity of 42 cubic feet, for supplying air to the torches and whistle, and for starting the engines.

The lighting plant consists of one 4-h. p. oil engine, connected to a 2-k. w. generator, which furnishes light for about 40 sixteen-candle power lamps, and which are connected by clutch to small air compressor.

The "Annie Johnson" left Pier No. 28 on the 29th of April, at 9:30 a. m., proceeded up San Francisco bay for a test of the engines and to determine the speed of the ship. Several trials were made over the measured course, observations being taken by the representatives of the Union Iron Works and the Matson Navigation company, and the agreed results showed a speed of almost exactly 10 knots when the ship was

running with flood tide, and 7.6 knots when running against the tide. The starboard engine ran at 230 revolutions per minute, the port engine at 218, the lower speed of the port engine being due to an obstruction in the water injection pipe which slightly lowered the power of this engine. The ship was fully loaded with 1700 tons of

miscellaneous cargo, drawing 17 feet 7 inches forward and 16 feet 10 inches aft, and had a 3 degree list to starboard.

The result of the trial was extremely satisfactory, the officers of the company expressing their satisfaction at the fine showing made. At the conclusion of the trial, the ship took a quantity of dynamite and then proceeded on her voyage to the Hawaiian islands.

The engines were supplied by Messrs. Henry Lund & company, of San Francisco, and the installation was made by the Union Iron Works at San Francisco, in accordance with the plans of the Matson Navigation company, and up to their usual standard of efficiency. The entire work of installation was completed in the record-breaking time of two weeks.

It is understood that the Matson bark F. P. Rithet is to be similarly equipped in the near future.

LUMBER TUG UNDER CONSTRUCTION.

At the yards of John Wilson, boat and ship builders on the east waterway in Seattle, is being built a power tug boat for the Merrill & Ring Lumber Co. for use at their logging camp near Pysht in Clallam County.

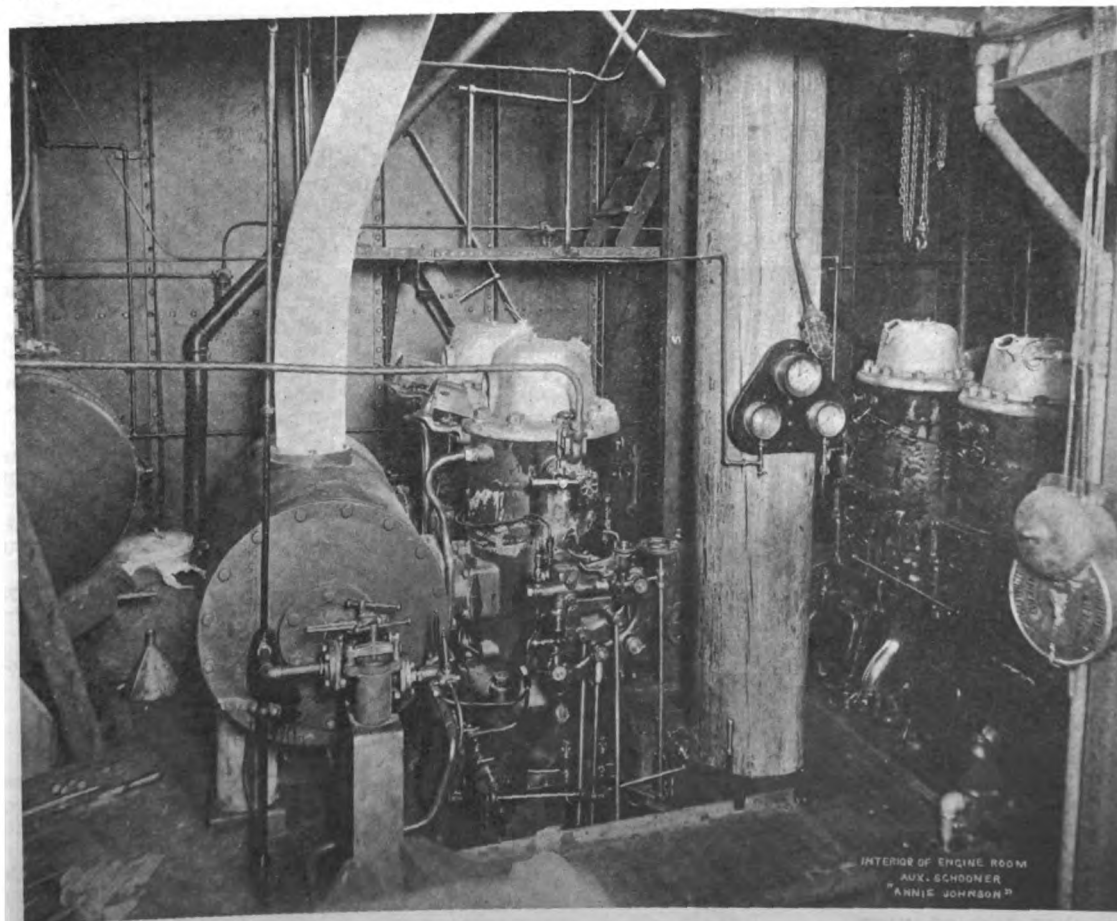
The boat is 47 feet long over all, 12 feet six inches beam and five feet deep. She is powered with two 35 h. p. Atlas engines. The port engine is geared to the towing bit. A Moran centrifugal fire pump and an electric light plant are belt driven from one of the engines. The fire pump is piped so it can be used to pump out barges. The boat was designed by Lee & Brinton.

FREIGHTER FOR STIKINE RIVER.

A new power boat will be built by the Hudson's Bay company for use on the Stikine river in Alaska. The new vessel will be smaller than the Port Simpson, will draw four inches when light and seventeen when loaded, and will use distillate for fuel. She will be placed on the run between Wrangell and Telegraph Creek, making the run every week as long as navigation is open.



"ANNIE JOHNSON" AFTER MOTOR INSTALLATION.



ENGINE ROOM "ANNIE JOHNSON"
Showing Her Two 160 H. P. Bolinder Engines.

Development of Motor-driven Vessels in Southern California

By Z. W. CRAIG.

California in general, and Southern California particularly is so firmly fixed in popular conception as a great playground that many otherwise well informed persons do not understand that while the patronage from relaxation seekers has been steadily increasing there has been going on simultaneously a steady industrial development.

Nowhere is this commercial progress more apparent than in the marine field. San Pedro is one of the coast's busiest harbors, San Diego is proportionately active and at these two points alone marine transportation is a business of prime importance. The fame of California game fishing has reached all corners of the globe and crowded out of the public eye the fact that her commercial fisheries are among the world's more important.

These two avenues of marine activity furnish a livelihood for thousands and engage the services of a large and growing fleet of vessels. Local and district shipping has provided a field in which a wide variety of carriers have been developed while the commercial fisheries, and of late particularly the tuna fisheries, have employed a big fleet of fishing vessels and fish carriers. Deep sea shipping has been an important factor and has resulted already in some local development.

A history of local maritime development in Southern California would also constitute an almost complete narrative of the introduction and adoption of the marine motor as it is almost the sole system of propulsion. The remoteness of the Puget Sound coal fields and the presence within the borders of the state of large oil fields long ago tended to give great impetus to use of motor boats and Southern California has today a fleet of commercial motor vessels of which her citizens can well be proud.

The call for vessels of this type resulted in the establishment of many ship building enterprises and San Pedro now has remarkably complete facilities of this character. A record of the more recent operations of some of the most important ones will be given later on.

The steam schooner Pasadena, built at San Francisco in 1887, and plying from Eureka to San Pedro for the Kerckhoff-Cuzner Mill & Lumber company, was the first vessel to use oil for fuel. After an explosion on a ferry boat at Carquinez Strait, which occurred some years later, oil was discarded, even on the Pasadena, but its use was resumed later when the danger was measurably reduced.

One of the first gasoline driven vessels in southern waters was the sloop Alpha, fifty-six feet in length, built in Alameda in 1893 and used for many years as a tender for the Southern California Fish company, which for some time operated a purse seine and canned sardines on a large scale at San Pedro.

Mitchell Duffy, who operated the ferry between San Pedro and East San Pedro, shortly afterward discarded his skiffs and substituted launches which were later sold to the San Pedro Transportation company, which succeeded to the business.

From this small beginning the motorboat and motorship business has grown by leaps and bounds until the building of such boats is a considerable industry, both at Los Angeles harbor, Long Beach and San Diego. It is estimated that the tuna fishing fleet alone, at the former location, will exceed 400 boats at the opening of the season, which usually begins in June. At San Diego there are nearly 100 more boats engaged in tuna fishing, while the fresh fish markets are supplied by a fleet which will bring the aggregate number above 600 boats in all.

A number of auxiliary schooners have visited the south in past years, but the coastwise lumber business, until recently, has been given over almost wholly to the oil burning steamer. The coming year will witness the introduction of many new motor lumber carriers.

In 1913 the Danish motorship Siam, operated by the East Asiatic company, made this a port of call and was the central figure in an elaborate celebration staged by the Los Angeles Chamber of Commerce in honor of the first vessel propelled by the Diesel engine. Later arrivals included the Kronprinzessin Margareta, of the Johnson Line, and others, some of which merely called to take oil and stores.

The principal oil fields are represented at Los Angeles harbor (San Pedro, Terminal and Wilmington) the Union oil company being the first to build a pipe line from the Fullerton and Whittier fields some fifteen years ago, the original line

only extending to Bixby Station, a few miles north of Long Beach, and there loaded into cars.

It is claimed that the crude oil from the Whittier fields, as well as most other Southern California oils, has been thoroughly tried out and works as well in Diesel engines as any other oil which has ever been tried. It can be used just as it comes from the wells, which is no inconsiderable advantage in itself.

The General Petroleum company has a pipe line running from the Maricopa field in Kern county, some twelve pumping stations distributed along the route finally forcing the oil into a 500,000 barrel tank on an elevation of about 300 feet above the level of the sea at Point Fermin. The company has a loading station near the shore end of the two-mile breakwater, where ships carrying 75,000 to 80,000 barrels can be loaded in twenty-four hours. The Standard Oil company has recently leased seven acres of tide lands on the inner harbor at San Pedro and now has a large system of loading and filling tanks in course of erection, the refinery being located at El Segundo, some fourteen miles distant, in an air line. It is said to be the intention of the company to supply every grade of oil which it manufactures to both the coastwise and the interior trade. The supply of both fuel and refined oil is brought here by tank steamers at present.

The Union Oil company, the pioneer company in this district, and previously mentioned, has large tanks at East San Pedro, which it is said will ultimately be moved to the concession of the Outer Harbor Dock & Warehouse company, on what is commonly known as the Miner Fill. The company's supply of refined oil is brought here from the refinery at Oleum, near San Francisco, at the upper end of San Pablo bay.

All of these companies are equipped with barges and tow boats, so that the large carriers, both general cargo and lumber, take their supply of fuel while loading or unloading on the other side.

Quite a number of boats have been equipped with engines of the semi-Diesel type this year, and others are expected to adopt them, owing to the extremely high price of gasoline and distillate.

LOS ANGELES HARBOR.

The boat building facilities of Southern California are represented by eight shops at Los Angeles harbor, three at Long Beach and five at San Diego, all of which have been busy during the greater part of the winter.

One of the oldest boat building establishments in Southern California is that of the Joe Fellows Yacht & Launch company of Wilmington, with an extensive yard at the upper end of the inner harbor. In the early days Fellows operated in a small way at Terminal, building a number of yachts, prominent among which was the sloop Venus, which beat everything in her class for eight successive years, only yielding to another Fellows creation, the Wasp. With the coming of the motorboat, Fellows fell into the line of progress associating with him Victor B. Stewart, under the present firm name, and built the Campbell, which, while a baby in size, showed her heels to everything, both large and small, for several seasons. He has built numerous fast speed launches since that time and is apparently never so happy as when taking a party of friends skipping from wave to wave like a jack rabbit going over the prairie. The boats built by this firm during 1915-16 include:

Type	Name	Owner	Length	Tonnage (gross)	Engine
Fishing boat	Essancee	Stafford-Crandall Co.	50-15	Fairbanks-Morse	50-h.p.
Fishing boat	Atlas	S. N. Kode	41.4-10/40	Atlas	32 h. p.
Fishing boat	Atlas No. 2	S. Shibata	39.4	8.33	Atlas
Fishing boat	Atlas No. 3	Y. Ido	41.6	10	Atlas
Fishing boat	Nishin	Stafford-Crandall Co.	40.4	8.27	Atlas
Tender tug	Diamond Girl	Diamond Match Co.	45	12.11	Atlas
Cruising launch	Ellington	U. S. Im. Serv.	62	Sterling	2 100-h.p.
Cruising launch	Azalea	U. S. Im. Serv.	62	Sterling	2 100-h.p.
Fishing boat	I. & H.	Y. Hiraga	37.6	8.53	Atlas
Fishing boat	Sister	T. Yostnoka	61	17.84	Standard
Spd launch	Malibu	Rhoda Rindge	23	Sterling	20-35-h.p.
Fishing boat	Two Brothers	Joe Vicci	36	Standard	20-h.p.
Spd launch	Mahogany Kid	Joe Fellows	23	Sterling	20-35-h.p.
Plsr bt	Earlida	Walter Wallace	40	Sterling	50-h.p.
Fishing bt	Tokai	Stafford-Crandall Co.	41	Atlas	32-h.p.
Fishing bt	Fujisan	Stafford-Crandall Co.	41	Atlas	32-h.p.
Kelp harvtr	Alice Marian	Am. Products Co.	40x60	Gray	150-h.p.
Dory	U. S. Immigration Service	16	Porto	3-h.p.	
Dory	U. S. Immigration Service	16	Porto	3-h.p.	
Supply bt	Union Oil Co.	40	Atlas	30-h.p.	
Spd bt	Scripps Inst.	La Jolla	25	Sterling	90-h.p.

Other boats are under estimate and the repair yards are filled most of the time with various craft being cleaned and repaired. Ample ways for small vessels up to 200 tons are connected with the works, which can be reached at all stages of the tide.

Another local builder whose work has made him well and favorably known is C. E. Fulton, who came to Los Angeles harbor some twelve years ago from Puget Sound and formed a partnership under the name of Fulton & Woodley with the late William Woodley, who died a few months ago. Fulton is now continuing the business under his own name. Many of the fast yachts of a few years ago were built at the old yards at Terminal, the new works being located on what is now called Mormon Island channel. Among these were the Alert and Mah-Pe, since taken to San Francisco, the yawl Winsome now an auxiliary yacht, and many others of almost equal note. Among the power boats built while Mr. Woodley was alive are:

Type	Name	Owner	Length	Eng.	h.p.
Fshg	Swallow	Chas Edolf	45	Imperial	35
Fshg	Nightingale	McCarren & O'Neil	48	Standard	35
Fshg	Pacific	F. Sarae	48	Imperial	35
Fshg	Neva	A. N. Agelsoff	45	Imperial	40
Fshg	Three Boys	A. Kudenoff	42	Imperial	35
Fshg	California	Tuna Exchange	42	Imperial	50
Fshg	Yalta	Peter Kudenoff	56	Sampson	35
Crus	Madeline	Giroux Cattle Co.	40	Imperial	35
			46	Imperial	35

Since the demise of Mr. Woodley Mr. Fulton has continued building, even on a larger scale than ever before. Only recently he went to San Francisco and successfully bid for the 150-foot kelp harvester for Swift & Co., to be used in connection with their new plant at San Diego. The hull was practically completed and launched in but little more than thirty days from the time the keel was laid. Mr. Fulton has bids in now on several large lumber vessels which he hopes will bring more work to his yard. In addition to the above he has added to the local fishing fleet the following:

Name	Owner	Length	Eng.	h.p.
Walkamura	Coast Fishing Co.	41.0	Standard	30
H. T. P. Co. II	Yamamoto	41.4	Imperial	35
H. T. P. Co. III	M. Swasaki	41.4	Imperial	35
H. T. P. Co. IV	S. Matsumura	41.6	Imperial	35
H. T. P. Co. V	G. Watanabe	41.7	Imperial	35
H. T. P. Co. VI	Oby Robirds	41.2	Imperial	35
H. T. P. Co. VII	A. Nabewari	41.7	Imperial	35
H. T. P. Co. X	S. Swatusubo	41.4	Imperial	35
Success II	J. Hamshita	37.2	Corliss	25
Success II	J. Hamshita	38.0	Standard	35
Beaver	J. Demaria	43.0	Hicks	35
Not named	Los Angeles Tuna Canning Co.	43.0	Corliss	35
Not named	Los Angeles Tuna Canning Co.	43.0	Corliss	35

Mr. Fulton is also building a speed boat to be called Flying Eagle, equipped with a 15 h. p. Eagle engine. It is expected that the boat will have a speed of 18 knots.

B. Eguchi, who started a boat building shop at Terminal about three years ago has built in all about forty-six boats for the fishing fleet, among which are the following:

Name	Owner	Length	Tonnage (gross)
America	G. Yamamoto	40	8.81
Argonaut	K. Takawa	40	8.15
Arrow I	S. Kaneshima	45.10	11.19
Chihaya	W. Kobato	41.7	8.74
Esuni	Y. Yamamoto	42	8.40
Ihoma	S. Hamari	42	8.85
Inari	T. Hiraga	41.4	8.21
Izumo	Y. Yamasaka	42	8.51
Jinzo	H. Rizon	40.4	8.43
Not named	N. Kenashita	41.7	8.32
Mio	K. Mio	41.4	8.22
Musashi	J. Makano	42	9.0
Nanki	S. Sumida	42.2	8.66
Naruto	T. Saka	42.2	9.87
Obuio Maru	R. Hashimoto	43.5	9.35
Okuma	Y. Okumura	40.7	8.55
Satono	S. Tamaguchi	40.3	8.19
Shiznoka	Mugogishima	40.8	8.70
Suma	M. Mizagawa	45.9	10.0
Takao	M. Takeuchi	41.8	8.88
Tenyo	S. Rigono	48	12.69
Terminal	Matsumoto	43.5	9.48
Tolstoy	J. Kosareff	42.2	9.14
Toyo	T. Yura	46	11.66
T. S. H.	Hatatanka	42.9	9.34
Not named	K. Kamemoto	42.9	9.34
Not named	T. Okuji	41.6	8.45
Not named	N. Seko	42.2	9.09
Not named	(Stock)	48.6	12.21

Al Larsen, one of the pioneer boat builders of San Pedro, and who was at East San Pedro until after the tide land decisions gave the location first to the Salt Lake Railway company and later to the city of Los Angeles, is now located on the original U. S. patent known as Mormon Island, although the process of dredging, bulk-heading and filling has converted the island into a peninsula, connecting with what was formerly Wilmington. Larsen builds good boats and at

(Continued on Page 23)

A REMARKABLE RECORD.

It is not generally known that the New London company—Electric Boat Co. accomplished a most unusual feat during the spring and early summer of 1915. They were given an order for twenty complete submarines, each boat to be equipped with a pair of 240 h. p. 8 cylinder four-cycle Nlsec Diesel engines. The boats were designed, the material assembled, and construction well under way in about thirty days after the contract was closed. The engines were designed and built at the company's plant in Groton, then shipped, and ten of the boats completed, put through their trials, and in commission in five months from the time work was started. Each of the boats



ARTHUR FULLER, Sales Mgr.
New London Ship & Engine Co.

made clean scores during their initial run of thirteen days, at a speed, slowed down to that of the escort, which averaged nine knots per hour.

The other ten boats were completed in record time and made equally satisfactory performances in their tuning-up runs and final trials. Each of these "little sea devils" cost approximately \$500,000 to build and equip, and are a distinct credit to American genius and hustle.

Other new sizes of commercial Diesels brought out by this company during the past year were a 60 h. p. 4-cylinder (smallest marine Diesel), a 240 h. p. 4-cylinder, and a 180 h. p. 6-cylinder, the latter on exhibition at the Panama Pacific Exposition at San Francisco, and demonstrated through its use for lighting the Palace of Machinery, the largest wooden structure in the world.

At the exposition the Nlsec engine, in competition with other marine fuel oil engines, received the highest award for Marine Diesels.

In addition to these commercial engines the New London company built during the year a number of two-cycle Nlsec Diesels for American and foreign submarines and other naval vessels. Some seventy engines, four-cycle and two-cycle, and totalling over 26,000 h. p., are now under construction at their works.

During the past year the output of this company was greatly increased through large additions to their plant, two new additions having been added to the already large machine shop. The administration building, which houses the business offices, designing and drafting rooms, and various naval commissions, was doubled in size. At this writing the company are adding a second foundry and are waiting the filling of their orders for more than \$100,000 worth of machine tools.

Because of the largely increased exports and consequent high price of gasoline, the fuel oil engine now bids fair to come into its own even more rapidly than was thought possible under normal conditions. The unsurpassed economy of the Nlsec Diesel is clearly shown by comparing, say, their 120 h. p., Model II, four-cycle unit, with a gasoline engine of equal power.

Example:

120 horsepower gasoline engine, 15 gallons, at .20.....	\$3.00 per hour
120 horsepower Nlsec Diesel, 6 3/4 gallons, at .04.....	.25 per hour
Saving in one hour	\$ 2.75
Saving in one day (10 hours).....	27.50
Saving in one year (3,000 hours).....	\$8,250.00

Although the first cost of the Nlsec Diesel is higher than the first cost of a gasoline engine, with the big saving on the fuel bill the engine easily pays for itself in a single year.

On the west coast fuel oil sells at an average price of two cents per gallon. On the east coast the price is about four cents per gallon.

The success of The New London Ship and Engine Co., is one of the industrial marvels of the age. They were organized about five years ago, obtained a foreign license, and since that time have developed and built more than \$5,000,000 worth of Diesels for submarines and commercial vessels.—Nlsec News.

NLSECO DIESEL ENGINED VESSELS UNDER CONSTRUCTION IN THE UNITED STATES.

Here follows a table showing all Nlsec Diesel engined vessels, both commercial and naval, now building in the United States, with dates of estimated completion based on reports of March 1, 1916:

SCHOONERS.

Schooner Powell, Westlake, La.—Two 60 H. P., March, 1916.
Schooner W. C. T. U., Rockland, Me.—One 120 H. P., March, 1916.
Schooner Lucia, Gloucester, Mass.—One 120 H. P., March, 1916.
Schooner, Gloucester, Mass.—One 120 H. P., April, 1916.
Schooner, Gloucester, Mass.—One 120 H. P., May, 1916.
Schooner Sound, Anacortes, Wash.—One 120 H. P., June, 1916.

FUEL SHIPS.

Tanker, Brooklyn, N. Y.—Two 2,500 H. P., Nov., 1916.

SUBMARINES.

Four Boats, Quincy, Mass.—Two 450 H. P., May, 1916.
One Boat, Quincy, Mass.—Two 420 H. P., May, 1916.
One Boat, Quincy, Mass.—Two 600 H. P., June, 1916.
Three Boats, Quincy, Mass.—Two 450 H. P., Aug., 1916.
Three Boats, Seattle, Wash.—Two 240 H. P., July, 1917.
One Boat, Portsmouth, N. H.—Two 440 H. P., Jan., 1918.
One Boat, Bremerton, Wash.—Two 440 H. P., Jan., 1918.
One Boat, Quincy, Mass.—Four 1,000 H. P., March, 1918.
One Boat, Quincy, Mass.—Two 440 H. P., Oct., 1918.
Two Boats, Quincy, Mass.—Two 440 H. P., Nov., 1918.
Two Boats, Quincy, Mass.—Two 440 H. P., Dec., 1918.
Two Boats, Quincy, Mass.—Two 440 H. P., Jan., 1919.
One Boat, Quincy, Mass.—Two 440 H. P., Feb., 1919.

STATIONARY INSTALLATIONS

Nitrate Plant, Antofagasta, Chile—Two 120 H. P., June, 1916.

TUNNEL STERN CANNERY TENDER COMPLETED.

A new tunnel stern cannery tender has just been completed at the yards of O. P. Graham in Portland for the Canoe Pass Packing company. The tender is 47 feet long, 12 feet beam and 6 feet deep. She will be equipped with a 50-h. p.

4-cylinder heavy duty Imperial engine and an Apelco generator working with an Edison storage battery.

She is a semi-V type of hull with the cargo hold forward and the pilot house, cabin, engine, etc., aft. She has a gasoline capacity of 500 gallons and carries 75 gallons of fresh water. She was christened the "Glacier" and went to Alaska the first of May under her own power.

HANDSOME POWER SCHOONER FOR THE SOUTH SEAS.

By no means a new vessel, but resplendent in new paint and equipment, newly rigged and powered with an engine that sends her through the water at a good clip, the handsome power schooner Ysabel May made her trial trip April 13 from the Union gas engine plant in Oakland harbor. The trip was made a social occasion by the owner, who entertained nearly a score of guests.

The Ysabel May was recently purchased from A. J. Bechtel, of Victoria, B. C., by Father Emanuel Rougier, owner of Christmas island in the south Pacific, to handle laborers and freight in the inter-island trade. The vessel was built at Halifax, N. S., in 1910, and still retains her British registry. She was at first equipped with a gas engine, and came around the Horn under her own power, but the engine was found to be too small and she has been operated as a sailing vessel on the Canadian coast. She is a sturdily built boat, 98½ feet long, 25¼ feet wide, and about 10 feet deep in the hold, capable of carrying about 160 tons. She was sailed to San Francisco, where she has undergone a complete overhauling, with the installation of an 80-h. p. Union engine. The rig was also changed to a two-masted schooner, and the general arrangement adapted to her new use. She is fitted up in a rather unusual manner, being strictly a yacht forward, with fine accommodations for the owner and guests, and a freight boat aft.

Coming down the coast she brought considerable cargo for the islands, and here she loaded a lot of brick and building materials for Father Rougier's new residence and native houses. She set sail for Papeete, the first stop on the way to Christmas island, on April 20.

CANNERY TENDER SHOWS SPEED.



TENDER "FRANK B."

Frank B. Peterson, of the Red Salmon Canning company, has good reason to be proud of his new tender, the Frank B., which when she came off the ways was expected to prove about the fastest boat on Bristol bay, but which was hardly expected to distinguish herself as she has on the first trip. The boat, whose smart and handsome lines are seen in the accompanying picture, reached Ketchikan, Alaska, 7 days 8 hours out of San Francisco, a distance of 1108 miles, having averaged only ¾ speed on the way up, and in spite of some rough weather, with head winds and seas. She was taken up by Capt. Harry C. Arndt, from whom Mr. Peterson has just received a letter stating that the boat has proven herself in good shape, being very seaworthy as well as fast. He says he is proud to be her master, and notes that half of Ketchikan turned out to see her.

After stopping there for fuel, she proceeded for Unimak Pass and the Naknek river.

An exciting feature of the trip occurred in Hecate straits, when a Canadian patrol boat showed a disposition to inquire her business. Putting on speed, she easily showed the patrol boat a clean pair of heels, and then slowed up to exchange greetings. During the race, Capt. Arndt says she made a speed of 12.35 knots for two hours, which is even beyond what was expected of her.

The Frank B. is 82 feet over all, with a beam of about 20 feet, and is very substantially built, with heavy sawed frames and 3-inch planking. Her power is a 150 h. p. Union engine. She has comfortable living accommodation, and on the trip up carried a crew of 8 men besides the captain.

M. S. CITY OF PORTLAND LAUNCHED.

The wooden motor ship City of Portland was launched at the yards of the St. Helens Shipbuilding plant on the afternoon of April 15. The new ship is a five masted schooner with two 4-cylinder semi-Diesel Bolinder engines driving twin screws as auxiliary. The engines are of the heavy oil type and develop 320 h. p. at 225 r. p. m., giving the ship a speed under power alone of about eight knots.

The City of Portland is 278 feet long over all, 48 feet beam and has a moulded depth of 22 feet. She is about 1600 tons net register, her total displacement being 5600 tons. She will carry 2,000,000 feet of lumber, 800,000 feet of this in her hold and the balance as deck load. With this cargo she will draw 22 feet eight inches.

The lumber that was worked into the City of Portland was the best obtainable and considerable gratification was expressed by her owners when the survey board gave her a rating L 11 for 11 years. Douglas fir in lengths up to 140 feet and in sizes up to 20x20 inches was worked into her keel and keelsons, and the bilge stringers and deck clamps run from 12x16 inches by 70 feet to 14x16 inches by 125 feet.

Two large hatches will be served by four steam cargo winches, power for which is supplied by a Scotch marine boiler installed in the engine room. Tanks with a capacity of 1,230 bbls. of fuel oil have been placed in the forward end and on each side of the engine room and in two tanks aft of the engine room 10,000 gallons of fresh water will be carried. The crew will be berthed in the forecabin as is common in vessels of this class while the officers' quarters will be on the poop.

The St. Helens Shipbuilding Co. is owned by the Charles McCormick & Co., who also own the St. Helens Creosoting Co., the Columbia County Lumber Co., and the St. Helens Lumber Co. They operate a fleet of eleven steam schooners in the coastwise lumber trade besides several sailing to foreign ports. During the year they will add to their fleet three motor ships and two steam schooners with a combined capacity of 3,330,000 feet of lumber. They have chartered the City of Portland to make four trips to Australia with lumber cargoes the earnings from which will be more than sufficient to pay the costs of her construction, about \$175,000. Returning from the Antipodes she will handle cargoes of coal for which she has a capacity of 2200 tons.

Oscar Harberg, expert for the Bolinder Engine Works, left the San Francisco headquarters April 21 to supervise the installation of engines in the City of Portland.

The new motorship City of Portland is equipped with model "M-II" semi-Diesel engines which the well-known firm of Bolinder have recently put on the market. This new type of direct reversible crude oil engine has been especially designed for large full power and auxiliary sea going vessels in two-cylinder sizes of 120 and 160 b. h. p. and four-cylinder sizes of 240, 320 and 500-600 b. h. p. The working pressure of the engine is about one-third of that of the Diesel engine, and as the troubles of the Diesel engine are generally traceable to the heavy pressure under which they work, this is a matter of much importance.

The new model shows many points of quite distinctive difference from the previous fuel engines and is remarkably simple in design. There is no cam shaft or intricate valve gearing, all the pumps, etc., being driven from eccentrics on the crank shaft, as is a small compressor which has been added at the fore end, and which supplies air for pulverizing the fuel on entering the cylinders. The air is compressed and cooled and then conducted to the injection nozzles through a small compensating vessel which connects with the starting vessel. When the stop valve is opened on this the vessel is charged with air from the compressor to a pressure of 170 lbs. per square inch instead of with combustion gases. The compressor, the compensating vessel and the starting vessel are all supplied with safety valves, eliminating any undue pressure.

In this new model the combustion, which is made as complete as possible, is obtained by mixing the fuel with the air before injecting it into the cylinder. The fuel injection valve is vertical and fitted into the top of the cylinder cover. The injection nozzle is made up of a central tube carrying the fuel which is surrounded by smaller openings admitting the compressed air. The fuel spreads through the whole of the combustion chamber but impinges partially upon a specially shaped projection in the interior of the bulb, this



LAUNCHING McCORMICK AUXILIARY "CITY OF PORTLAND."
"City of Astoria" is Shown at Right, Under Construction.

being of course the point of maximum heat, so that presumably, the combustion spreads regularly throughout the whole mixture.

In the new engine the ignition bulb has been improved so that it only becomes a dull red when running on an overload and under normal conditions is quite black, which shows that it is not subject to undue wear. The governing of the engine is by the "hit and miss" principle, thus eliminating the centrifugal governor and it is claimed that the engine can be run indefinitely without load and without blow lamps. Forced lubrication has been fitted throughout, including the main bearings, and a considerable reduction has been effected in the lubricating oil consumption to the cylinders. No water being injected into the cylinders, it is not necessary to carry as much as in the case of the Diesel engine, which is an important factor in vessels making long trips.

The clutch, reversing and fuel control levers of the two engines are brought close to the engineer's hands. The fuel control lever alters the strokes of the fuel pumps and there is another lever operating valves in the passage between the cylinders and the crank chambers, so that more or less air can be admitted into the cylinder according to the load on the engine. When running light, of course, these valves are partially closed, there being a common spindle with a valve for each of the four cylinders.

The engine is reversed by pre-ignition and this reversing gear is one of the outstanding features of the Bolinder engine. The manouvering of the engine is as simple as handling a steam engine and can be done with promptness and certainty of action.

Each engine is fitted with the usual silencer at the back of the engine, and there is also a secondary silencer for both motors, the exhaust gases delivering into this before being led up to the mizzen mast.

This engine, it may be mentioned, is the outcome of three years experiments, and before being put on the market, was thoroughly tested by being installed in a large sailing ship trading for some time between South America and Scandinavia. This practical test proved satisfactory and then Messrs. Bolinder decided to place the engine on the market.

BOLINDERS IN DEMAND

In the growing demand for cheaper transportation in both the freight and passenger service the Diesel and semi-Diesel engines are playing an important part. The cheapness of installation and operation together with the saving of space over the steam propelled vessel have led to their adoption under conditions where steam would be impracticable. Among the heavy oil engines which have been developed to meet this demand those put out by Messrs. Bolinder at Stockholm and distributed on the Pacific Coast by Henry

Lund & Co., of San Francisco, seem to be meeting with a well deserved success.

The new "Bolinders" engine has been ordered by a considerable number of firms in America who favor the oil driven cargo vessel, also at the present time there are under construction at Stockholm twelve 500 b.h.p. sets to be installed as triple screw machinery in four 5000-ton dead-weight Norwegian vessels, building in American yards. The speed of these ships will be about 11 knots. Other "Bolinder" installations in hand for American owners include six twin screw equipments, each of a total horsepower of 640.

The "Bolinder" engine is finding favor on the Pacific Coast with many of the leading shipping firms who have adopted it both for coastal and ocean going ships.

The following is a list of well known ship owners who are installing "Bolinder" engines in vessels built and under construction:

Pacific Coast.			BHP
Chas. R. McCormick & Co., aux. ves. No. 1....	2-320		640
Chas. R. McCormick & Co., aux. ves. No. 2....	2-320		640
Chas. R. McCormick & Co., aux. ves. No. 3....	2-320		640
E. K. Wood Lumber Co., motor ship No. 1....	2-320		640
Matson Navigation Co., aux. ves. No. 1....	2-160		320
Matson Navigation Co., aux. ves. No. 2....	2-160		320
Mr. Andrew Mahony, aux. ves. No. 1....	2-160		320
Mr. Andrew Mahony, aux. ves. No. 2....	2-160		320
Mr. Andrew Mahony, aux. ves. No. 3....	2-160		320
Shell Co. of California, motor tanker No. 1....	1-320		320
D. J. Hanlon, tug boat No. 1....	1-160		160
Pilot Vessel No. 1....	1-120		120
Honolulu Iron Works, aux. ves. No. 1....	1-240		240
Borden & Lane, aux. ves. No. 1....	1-160		160
Eastern Coast.			
Tanker No. 7, building, Baltimore, (Vacuum Oil Co.), tanker	3-500		1,500
Tanker No. 2, building at Baltimore	3-500		1,500
Tanker No. 3, building at Baltimore	3-500		1,500
Tanker No. 4, building at Baltimore	3-500		1,500
Standard Oil Co., New Jersey, aux. ships	6-320		1,920
Kineo Texas Co., aux. ship	2-320		640
Barge 62, Standard Oil, tanker	1-320		320
J. B. King & Co., barge	1-320		320
Manhasset, freighter	1-320		320
Carmela, bark	1-320		320
S. S. West, auxiliary	1-160		160
Eclipse, auxiliary	1-160		160
Alembic, schooner	1-100		100
Gilbert Islands, schooner	1-100		100
Chiriqui, schooner	1-100		100
Ocmulgee, carrier	1-100		100

MOTOR FOOD PURVEYOR FOR FISHING FLEET.

There has just been completed at Tacoma for the Northland Trading & Packing company, an interesting marine layout for use in Alaskan waters. It consists of a 52-foot tug, the Shamrock II, and a 64x12 double decked barge which will be operated as a saltery and a store and bakery for supplying food to the King salmon fishing fleet operating each summer between Wrangell and Petersburg.

The tug built by Johnson and Wogbo is a very sturdy vessel along the lines of a cannery tender, and is equipped with a 45-h. p. Fairbanks-Morse "C-O" type engine.

WILL BUILD LARGEST AMERICAN HOT BULB ENGINES.

H. W. Sumner, a Seattle engineer, has just let a contract for the construction from his own designs of two 350 h. p. 2 cycle 4 cylinder, hot bulb fuel oil marine engines. These engines are the largest of the type ever undertaken in America and because of their many unique features in design they are attracting wide general attention. They are being built to the order of Messrs. Swayne & Hoyt, of San Francisco, and will be installed in a 3,000 ton lumber schooner being built for these people by the Grays Harbor Shipbuilding Co. at Aberdeen, Wash.

Many of the Diesel and so-called semi-diesel (really hot bulb or hot plate engines) now in existence show very strongly the influence of gas engine practice in their design. Mr. Sumner has proceeded upon the theory that the present marine steam type represents to a degree the survival of the fittest in marine motive power in that it is the sum total of the experience of thousands of marine engineers and mechanics and has been arrived at only after a demonstration of its qualities under practical working conditions at sea. He has recognized that the type is basically more nearly related to the steam engine and he has departed very widely from the traditional gas engine form and has produced a design in which he endeavors to embrace as many of the desirable features of the marine steam installation as are adaptable.

The result of his labors, which extend over a number of years, will be of interest to every one who has been following the evolution of the heavy oil engine. Mr. Sumner's objective has been to produce an engine which will be as dependable as the natural limitations of the principle permit and will be so constructed as to permit the anticipation of engine troubles rather than their belated discovery. The first thing which strikes the eye in inspecting the drawings of the Sumner engine is its openness which is best illustrated by a somewhat detailed description of the construction of the 350 h. p. unit in question. This engine is of the open column vertical marine type. The four cylinders are independent of each other and are bound together only by a steel bar 1½x8 running fore and aft along the front side and by means of the exhaust manifold on the back side. These cylinders are cast on end to assure a uniform strength throughout, this being the first time this plan has been adopted with engines of this character. The exhaust and intake ports are incorporated in the cylinder itself and are covered and uncovered by the piston. All of the pumps are beam driven from the crossheads and there are in fact no eccentric driven parts on the Sumner engine. Each of the cylinders is supported on the back side by a cast iron column which carries the crosshead and on the front side, for maximum accessibility, by a turned steel column. Any of these columns can be removed without dismantling the engine, and indeed any cylinder can be disconnected and cut out permitting the engine to run on the other three.

The connecting rods of the standard marine type and are are forked at one end and T shaped at the other. Another feature which is an innovation in the marine motor field. The bed plate is in one piece and consists of 5 U shaped girdles. The upper part of the bed plate and lower flanges are connected to the webs and stiffened by ribs. The thrust block is rigidly bolted to the bed plate. The thrust is of the horseshoe type and was specially designed for these engines. It is so made that the tail shaft can be disengaged and allowed to run idle when the vessel is under sail power.

The engine is unique in that it has no fly-wheel the inertia of the moving parts being utilized to perform the function of the ordinary flywheel.

These engines are built to develop in excess of 350 h. p. at 210 revolutions but can be run as slowly as 120 r.p.m., at which they develop practically full torque. They start by compressed air and the operation can be performed as rapidly as in the case of a steam engine. The charge is ignited by a hot bulb which is heated by fuel oil, a departure from ordinary practice. The engines are directly reversible and both operations are accomplished by a single lever, from the engineer's platform. In ordinary installations both engines can be handled by a single man.

Some idea of the size of the units under construction can be gathered from the following rough dimensions. They are 13 feet high, 6.9 feet at the base and have a crankshaft 10 feet long

and 7¼ inches in diameter. The thrust is 5 feet long. Each engine will weigh 35,000 pounds. Mr. Sumner expects to build engines of from 80 to 500 h. p.

They will be built in accordance with Lloyds requirements as far as these are adaptable to marine oil engines. Both engines will be rushed to completion the first being ready in ninety days.

One of the features to which Mr. Sumner points with justifiable pride is the fact that the similarity of his engines to the best marine steam types make a steam marine engineer particularly fitted by previous training to learn to operate one and this will be a factor of some importance when big motor vessels begin to go into operation in larger numbers. The men who will operate this pair of engines are going to follow them during their construction in the shop.

Mr. Sumner is operating under the name of the H. W. Sumner company with offices in the L. C. Smith building, Seattle.

The vessels in which these motors will be installed are described elsewhere in this issue.

WILL BUILD MOTORSHIPS AT GRAYS HARBOR.

The Grays Harbor Shipbuilding company has been formed by A. Shubach, M. R. and E. R. Ward, of Seattle, for the purpose of building wooden auxiliary powered vessels at Aberdeen, Wash. Mr. Shubach is a well-known Seattle shipping man for years a member of the firm of Shubach and Hamilton and a prominent operator in the deep sea and Alaska shipping trade. The Ward brothers have been established for years in Seattle as Ward & Son and have operated a shipyard, etc., at this point.

M. R. Ward has gone to Aberdeen and has laid out a fully equipped yard and has already begun construction of three five-masted power schooners of some 3,000 tons burden. The first two to be completed have been sold to Swayne & Hoyt, of San Francisco, who have been particularly active in the shipping field in the past year.

These vessels will be 290 feet long with a beam of 48 feet and will have a lumber carrying capacity of 2,200,000 feet. The first will be equipped with two 350 Sumner hot bulb heavy oil engines, a new type which is fully discussed elsewhere in this issue.

A small Scotch marine boiler will be installed in the engine room to furnish auxiliary power to the winches. An electric generator will be run off one of the main engines furnishing power for the lighting, etc. Two thousand barrels of fuel oil will be carried in tanks in the engine room. No accommodations have been provided for passengers. The usual crew's quarters, chart house, etc., are on the main deck aft in the poop. The schooners are larger and higher powered than any now under construction on this coast and will greatly augment the present fleet of lumber carriers now in the trade.

MOTOR BARGES FOR GOVERNMENT USE IN ALASKA.

The Alaska Engineering Commission will this summer have in operation on the Susitna river four power barges to use in handling material in the construction of the government railroad. Last year the commission bought one barge that was set up and one knocked down hull. These two barges are 40 feet long, 20 feet beam and carry 15 tons. The barge in operation is equipped with two 35-h. p. Scripps motors. This year two 35-h. p. Sterling engines have been put in the other hull.

Two other barges were built this year at the yards of the Canal Manufacturing company, Seattle, one of them being sent to Anchorage, Alaska, knocked down, and the second one was launched and tried out on the sound before being sent north loaded on a big scow. These two barges are 87 feet long, 23 feet beam and carry 45 tons. When light they draw eight inches and when carrying a full load are expected to draw only 20 inches. They are equipped with two 50-80-h. p. Buffalo engines which drive 30-inch propellers in tunnels. When tried out here the barge developed a speed of 14½ miles an hour. These barges were designed and built under the supervision of Capt. Chas. Binkley.

The propellers on these barges drop down when working in deep water and are protected from

hitting when shallow water is reached by shoes attached to the stern bearing of the shafts and running down under the wheels. When these shoes hit bottom they raise the shafts and propellers up into the tunnels. In the barge used last year there was an universal joint on the shaft outboard of the stuffing box, but it was found that the river sand cut the bearing of the joint box so badly and the strain of the thrust was so great that some new device had to be used. On the new barges the shaft goes outboard through a ball and socket joint which has a stuffing box on the inboard end and a pipe for the shaft to run in screwed into the outboard end. This pipe is screwed into the after bearing which also has a stuffing box so the shaft and bearings do not come in contact with the river water or sand. The propeller is protected by a shoe as before, the thrust is taken up by a bearing attached to the ball and socket joint and between that bearing and the engine are two universal joints to take up the alignment. The end of the shaft at the engine is squared and fits neat into a casting on the fly wheel so there is no tension from the lifting or lowering of the propeller.

Capt. Binkley also built a third barge from the same plans for Capt. Sid Barrington of the Side Stream Navigation company. This barge was shipped to Wrangell knocked down and will be set up there for use on the Stikine river. She will be powered with two 6-cylinder Wisconsin motors, made by the Wisconsin Manufacturing company, at Milwaukee, of which the Chandler-Dunlap company, of Seattle, are the Seattle agents. These engines develop 95 h. p. each and are expected to give the barge a speed of about 18 miles an hour.

MOTOR FERRY FOR SEATTLE.

The Port of Seattle is building a motor ferry for service on Elliott Bay between the city and West Seattle. The new ferry will be of the double ended type, designed for passengers only. She will be 100 feet long, 28 feet beam and ten feet deep. She was designed by Lee and Brinton and is being built at J. F. Duthie & company's yards.

The ferry is being built to the requirements of the American Bureau of Shipping. The hull is divided into five watertight compartments so arranged that she will float when any one of them is flooded, and the machinery is so light that she is expected to stay afloat if all of the compartments are flooded at once. Treated fir is being worked into the hull in as long lengths as is possible, some of the longitudinals being ninety feet long.

She will be propelled by a six-cylinder, 9 by 13 inch, two-cycle Southwark Harris valveless oil engine developing 225 brake horse power at 300 revolutions per minute, giving a speed of about ten knots. This engine was sold through the Pacific Net & Twine company, of Seattle. There will be a propeller at each end, but the forward one will not be used because of the danger from the large amount of drift wood that usually floats in the bay.

The fire and bilge pumps, electric generator and auxiliary air compressor will be operated by a two-cylinder, eight horse power Standard gas engine. The dynamo will be a 115-volt, 3-kilowatt General Electric company machine. The fire pump will be augmented by two hand pumps, the fire lines having three outlets at each end of the main deck and one on the upper deck amidships. The boat will be heated in cold weather by a small kerosene boiler with hot water radiators in the cabins, toilet rooms and pilot houses.

With the price of oil at three cents a gallon the cost of operating this boat will be much less than if she were a steam propelled vessel. The trip across the bay will take about twenty-five minutes and with the engine burning twelve gallons of oil an hour the round trip should be made for 15 cents. Later it is proposed to place the controls of the engine in the pilot house, the engine to be governed by the captain by means of compressed air. If this is done one of the deck hands can be dispensed with and operating cost cut that much.

Work is now well advanced on the vessel, the planking and miscellaneous iron work having been practically completed. It is expected that the vessel will go into commission about a month after the delivery of the engine.

BIG BARKENTINE RE-POWERED.

Few power installations have been of as much interest on the Pacific Coast as that of the "Marie," recently completed at San Francisco. The "Marie" is best known under her former name, the "Archer" and which she bore during the years when she operated between Seattle and San Francisco. In those days she had the distinction of being the only producer gas engine vessel on the Pacific.

She was formerly the British bark "Archer," having been built in England in the year 1876; the hull is of iron and is 185.2 feet over all, 31.6 feet beam and 11.1 feet depth of hold. She is of 900 tons gross and 686 tons net register and will carry a cargo of about 1300 tons deadweight.

Some years ago, while still a British bark, she was dismantled and thrown on her beam ends in a gale off Cape Flattery and was towed into Puget Sound in distress. She was repaired and rigged as a three-masted barkentine and later obtained American registry. She was then used for a number of years in the sugar trade between the Hawaiian Islands and San Francisco, being then owned by Welch & Co.

About 1907 she was bought by the Tacoma & Roche Harbor Lime company, who decided to make an auxiliary vessel of her, and installed a producer gas plant and a gas engine of 300 h. p. This installation was watched with great interest as at that time a great deal was hoped for from this type of power. With these engines she has operated up till recently with indifferent success.

Last year she was chartered to take lumber from Puget Sound to New York and ran into a gale when off southern California, and the vessel was towed into San Pedro in distress. Her cargo of lumber was discharged at San Pedro and the vessel sold to C. Henry Smith, Inc., who had the vessel towed to San Francisco.

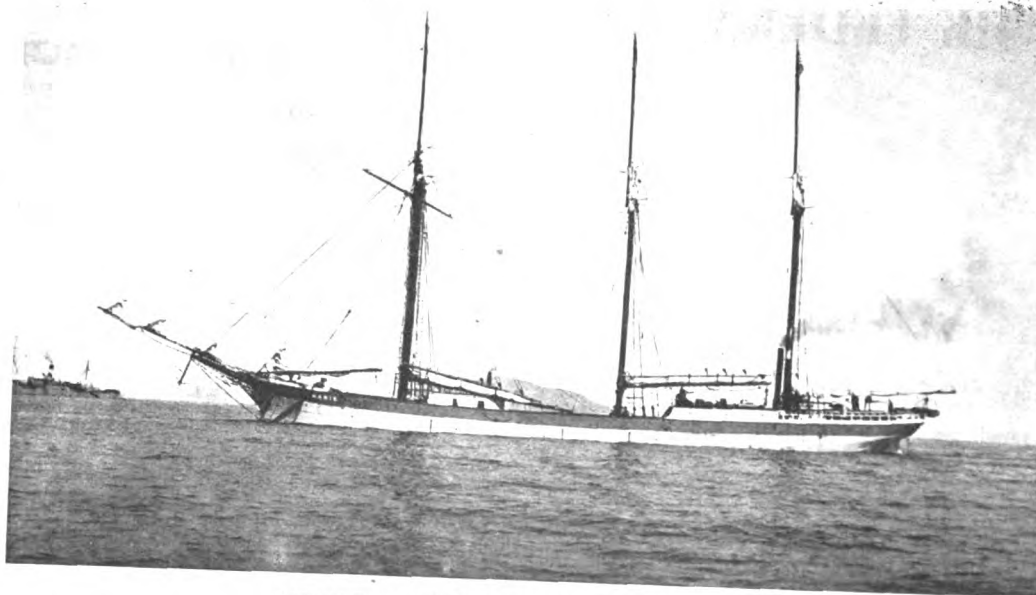
The vessel was then bought by Swayne & Hoyt and it was decided to repair her and install a 200 h. p. Mietz & Weiss oil engine. The old engines and producer gas plant were removed and the new engines installed by the United Engineering Works. The engines were placed as far aft as possible and just forward of the engine room bulkhead, which divides the engine room from the cargo hold. Formerly the producer gas plant and bunkers were just forward of this bulkhead on the 'tween decks, and, upon eliminating these, it was possible to obtain considerably more cargo space. In the lower hold, forward of the engine room bulkhead, are two fuel oil tanks which carry about one hundred and eighty-five barrels each, giving the vessel a steaming radius of about thirty-five days at full power.

The engines were guaranteed to develop 225 b. h. p. at 2400 r. p. m., but exceeded the guarantee by developing 252 b. h. p. on the testing stand. The engine was further guaranteed to use not more than seven-tenths of a pound of oil per horsepower hour. During the test made on this engine it was found that it developed its rated horsepower on six-tenths of a pound per horsepower hour.

An auxiliary plant, which includes a 12 h. p. Mietz & Weiss oil engine air compressor unit, is situated on the port side of the engine room, and to this engine is connected by clutch a geared duplex pump, which is used for pumping bilges, washing decks and other services. An electric generator is also driven off this engine, which supplies lights for the ship, there being quite an extensive lighting plant installed. The air compressor is used to charge the air tanks for starting and reversing and is only used for the first start, as the engine is equipped with a compressor which amply furnishes air for maneuvering. Both compressors are furnished with an unloading valve which allows the compressors to work in a vacuum when the air tanks are up to pressure.

During trials on the bay with this vessel it was found that the engine used about seventeen and one-half gallons of "Calol," manufactured by the Standard Oil Company, which has a gravity of about 24 degrees Baume, and gave the vessel a speed of six knots an hour when loaded with 1300 tons of cargo, and in ballast a speed of about 2½ cents a gallon in San Francisco it can be readily seen what cheap power this is. The auxiliary engine was found to use about one gallon an hour.

This vessel is now on a trip to Yokohama and Manila and will probably load there for San Francisco, and there is no doubt but that her performance will be watched with a great deal of interest by the shipping people of the Pacific Coast, many of whom are now seriously consid-



BARKENTINE "MARIE," FORMERLY THE "ARCHER."

ering the installation of auxiliary engines in sailing craft.

The Mietz & Weiss engine is an American product, built in New York, and by no means an experiment, as engines of this type have been built by this firm for stationary and marine purposes for the past twenty years.

The engine for the "Marie" was sold to Swayne & Hoyt by W. J. Gray, Jr., San Francisco representative of the August Mietz Machine Works, and the installation was directed for Swayne & Hoyt by Lloyd Swayne, with suggestions from Julius Roos, who is the factory engineer on the Pacific Coast.

The price paid by Swayne & Hoyt for the vessel was \$30,000, which was practically for the hull only, as that was about all that was worth

anything, and they spent about \$25,000 in putting her into her present condition.

However, the charter money which the vessel will have earned when she returns here from the Orient will just about net the company enough to cover her total cost, so that what some wise-aces at first were inclined to look upon as a foolish expenditure of money now looks as if it will prove a decidedly remunerative investment, to say the least.

In this connection, also, it is pertinent to mention that so well pleased are they with the "Marie" and her auxiliary engines that engines of the same kind, of 350 h. p., are to be installed in the vessel to be constructed for them at the Lindstrom yards on Grays Harbor.

U. S. A. Engine Company Organized

For some time past rumors have been rife in San Francisco of the formation of a combine of gas engine companies operating in that territory. On April 18th the formation of the U. S. A. Engine company was completed and the new corporation, capitalized at \$1,500,000, took over the Standard Gas Engine Company at a consideration reputed to be approximately \$600,000. As nearly as can be gathered, however, the transfer involves the Standard company only.

It is reported the new corporation is backed by Eastern parties whose names have been carefully withheld to date. It is understood, however, that it is proposed to considerably broaden the scope of the business, although operating for the present at least along the lines of the regular Standard policy. Work will be started in the near future on extensive improvements to the plant on the Oakland estuary, which is already one of the finest in the industry. The company owns several adjacent blocks of waterfront land which will ultimately be utilized in expansion.

James A. Hawkins, for years the active manager of the Standard company, states that he has sold his stock in the company to George Emmons, of the Emmons Safe Moving Co., San Francisco, but Motorshop's representative was unable to secure any statement from Mr. Emmons because of his absence from the city. Some other stock changes hands but Mr. Hughson, of Hughson & Merton, still retains a considerable interest. Mr. Hawkins has not been in the best of health for some time and it has been previously reported that he expected to become less active in the concern. He is, however, still the secretary and a director of the business.

No confirmation is obtainable to the report that other San Francisco gas engine companies are involved. The use of the name U. S. A. was thought to be an adaptation of "Union," "Standard" and "Atlas," but there is apparently no reason for assuming that any plans of this sort have borne fruit. O. H. Fischer of the Union Gas Engine Co., is reticent on the subject but states that he has been approached with a proposition to enter a combine but that no proposition was made to him which he will consider seriously.

The fact that the Union company has accepted the agency for the Craig diesel engine would seem to insure the continued independence of the Union company. The other companies have also been approached, but have not seen fit to take the matter up seriously.

The U. S. A. Engine company retains the agency for the Southwark-Harris valveless oil engine, and is reported to be engaged in negotiations with the Southwark Machine & Foundry Co., and its parent concern the Baldwin Locomotive Works to manufacture these engines, in the smaller sizes at least upon the Pacific Coast. What arrangement will eventually be arrived at if any is not known, but it is thought that the ideal plan is one which would involve the manufacture of gas engines in sizes up to 100 h. p. and diesel type motors above that size.

At the Standard office it is stated that it has been impossible to take care of the business offered for Southwark-Harris engines. Some of the Eastern parties interested in the new company have been visiting San Francisco recently, and express great surprise at the opportunities for manufacturing which already exist here. They consider the advantage in climatic conditions over Eastern manufacturing centers a great asset, while during the last year labor costs in different parts of the country have been largely equalized, and while this section lacks some raw materials, they may be brought in at least as cheaply as the finished products. Moreover, they note the probability that raw materials for such manufacturing will be developed near at hand to an increasing extent; and as for the outlet for their products, which has formerly been so limited as to hamper a really large manufacturing enterprise, they find a demand far above all expectations, with all indications that it will continue to increase in years to come.

It is denied that the new company will build a factory at Seattle. The assertion in the daily papers that the new company has a large amount of war business is without foundation, the increase activity coming entirely from normal channels.

MOTOR VESSEL CONSTRUCTION BRISK AT VANCOUVER.

The Vancouver Shipyards are experiencing a bit of a boom in repair work and outfitting for the season. The worst of the dullness consequent on the chaotic business conditions due to the war has passed and the future looks brighter because economic and financial readjustments have been made and confidence in a measure restored.

The Motorship is becoming an absolute necessity for industry on the coast. A few years ago one shipyard used to turn out daily one oar-propelled fishing boat the year round. Now, however, there is no demand for this class of boat but the need is for small motorships, which are used as fishing boats and carriers of all sorts. The only river in British Columbia that is barred to the motorship as a fishing craft is the Skeena and this bar seems doomed soon to be lifted.

Nearly all the well-known makes of motorship engines in America, as well as Continental products, are represented by agents in the coast cities of British Columbia, but because of the war and the difficulty of obtaining confirmation of orders and shipments the trade is largely in the hands of United States factories, whose engines stand up well against the heavy seas that frequently strike this coast. The chief difficulty about a Continental engine is that when a part is broken communication has to be made across the water and time, money and patience are lost. European makers do not cultivate the trade so much as they expect the trade to cultivate them. Thus in motorship engine salesmanship the United States factories forge ahead.

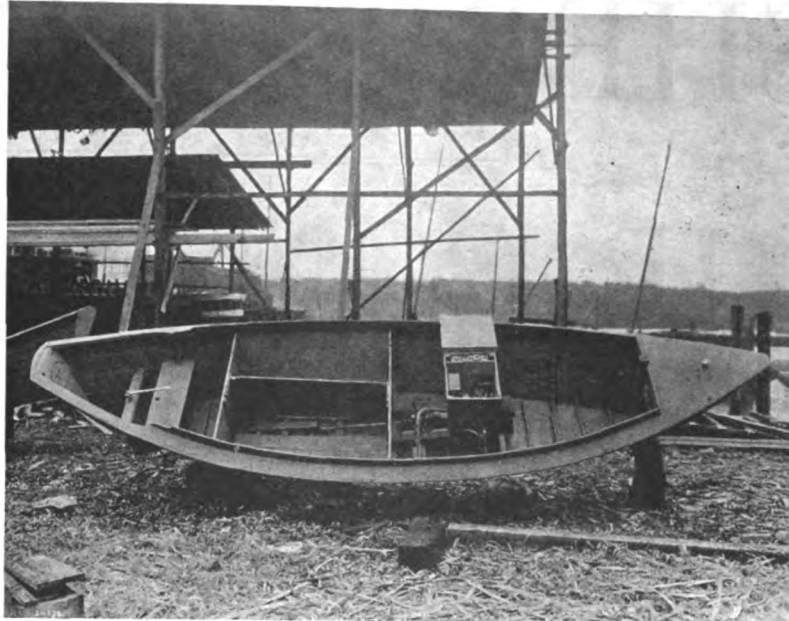
However, John W. Thompson & company, agents for the Turbinia company, England, Diesel and Semi-Diesel engines, report inquiries good and that they are preparing to tender on engines for the lumber vessels proposed to be built under the Subsidy Scheme of the British Columbia government.

The Vancouver Machinery Depot, Captain Walkem, manager, reports that as agent for the Eastern Standard engines he is planning to seek a share of this business also.

A trip among the shipyards of Vancouver gleaned some interesting information.

The Vancouver Ship Yard Limited, Coal harbor, report being busy on general repairs and overhauling of the "Laurel" and the "Adam," the A. B. C. Packing company boats.

Type of Power Boat Built for Alaska



The Weise Packing company have shipped to their cannery twelve power dories to sell to the fishermen who find them much handier than the old way of a long pull and a strong pull. The new dories are 16 feet long by four feet beam and powered with a four h. p. Regal engine.

They were built by John Wilson, ship and boat builder of Seattle. They are sheathed with white pine over oak frames and the hull is divided up so the engine comes about amidships with a large double fish bin immediately aft of it.

The efficiency of the fishermen is so much improved by the adoption of this type of boat that they can well afford the investment of the \$165 that the boats cost them. They are able to get to and from the fishing grounds quicker and stay on them longer, besides being able to spend more of their energy in catching and looking after their fish than they could when they had to push a heavy boat load every time they came in to the cannery.

Cappell Bros. are building a 32x8 foot boat to be installed with a 4-cycle, 4-cylinder, 16-h. p. Peerless to be used on the Kootenay Lakes passenger service, taking the place of the "Jessie Ellen."

W. R. Menchion is putting in a second-handed 60-h. p. Canadian Fairbanks-Morse engine, Semi-

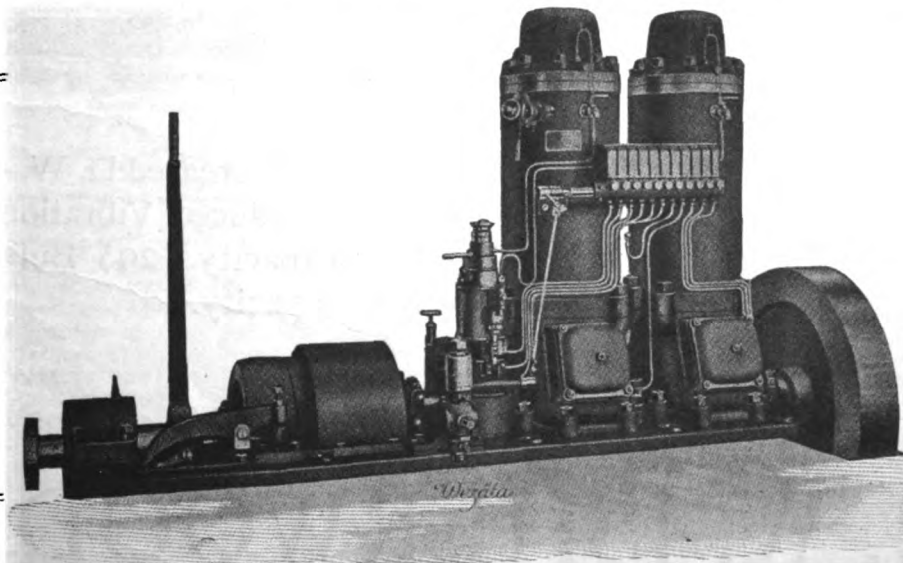
Diesel, in a new hull 58x15 feet, for the Gosse-Millerd Packing company, and is also building 6 new life boats 17 feet 8 inches by 5 feet 2 inches for the Canadian Pacific Steamship company, to be used on their Arrow lakes boats.

The Western Machine Works report they bought the "Prince Albert" and sold the hull for Mr.

SKANDIA SEMI-DIESEL CRUDE OIL ENGINE

For CUTTERS, SCHOONERS, FISHING BOATS, TUGS, Etc.
Especially Suitable as AUXILIARY ENGINES in Sailing Vessels

Economical
Reliable
Low Fuel
Consumption



Standard Sizes,
5-500 B. H. P.
250,000 B. H. P.
of SKANDIA
Engines Already in
Use all Over
the World

ALASKA AND NORTHWESTERN REPRESENTATIVES

SKANDIA ENGINEERING COMPANY 208 Grand Trunk Dock Seattle

J. H. HANSEN & CO., Pacific Coast Agents, SAN FRANCISCO

Lampe to J. E. Taylor for a logging camp boat, to be used at Ocean Falls. They are installing for the new owner a new 2-cylinder Clay engine.

They are also handling "Giant No. 1" tug-boat, owned by the Giant Powder company, and repairing its hull and giving it a coat of copper paint.

The Pacific Mills Limited are having their boat "Rosina K," Frisco-Standard engine, overhauled and her hull copper painted for the season.

Ferrier & Lucas, marine engine agents, report business good. Lately they installed a new 15-h. p. Gorham engine in a seine boat, 42x11 feet, which was designed by E. B. Sharpe for the Preston Packing company. A. Hawkins, a her-ring fisherman, has had a 10-h. p. Gorham engine installed; the B. C. Marine Railway have placed an order for a 10-h. p. Gorham, and Pacific Mills Limited, Ocean Falls, are installing new 15-h. p. Gorham.

The B. C. Sulphite company have asked tenders for and got figures on the building of 3 wooden vessels, to be motored with auxiliary power to the extent of 350 h. p., Semi-Diesel. It is reported they propose to have a fleet of ten before long.

Boyd's Limited, Port Moody, whose bonds for \$200,000 have been guaranteed by the Port Moody Corporation, are planning to lay down two wooden vessels, 230x45 feet, to be powered as an auxiliary with 350-h. p., Semi-Diesel engines.

The Clifton Kerosene Engine is being considered in a contract for a 40-h. p., which will be closed in a week or two.

Edward Lipsett, agent for Southwark-Harris Foundry and Machine company, Philadelphia, reports inquiries steady. He is prepared to tender on auxiliary power engines for any vessels built in British Columbia under the Bowser government proposal. His principals build Diesel engines up to 1000 h. p.

SAN FRANCISCO AND OAKLAND NOTES.

Wm. Cryer, of Oakland, recently completed a new towboat, 40 by 9 feet, for the Crowley Launch & Towboat company. She was equipped with a 30-h. p. S. F. Standard engine and shipped to Callao. Cryer is also working on a boat 26 feet long, 7 feet wide and about 3 feet deep, and one 28 feet long by 8 feet wide by 3 feet 5 inches deep, both to be equipped with 10-h. p. S. F. Standards, to be sent to South America. The Crowleys are also having two larger boats built for South America, to be about 65 feet long, 21 feet in the beam, with a draft of 6 feet, and powered with 110-h. p. S. F. Standard engines. These are strongly built, seaworthy boats, with large fuel capacity, and will be used for long hauls to carry both freight and passengers.

Wm. Cryer recently completed an exceptionally fine pair of boats for the Alaska Packers' Association's fisheries on Bristol Bay, Alaska, which are now well on their way north. The boats are twins as far as construction is concerned, and their lines are a particularly fine example of Mr. Cryer's work, their appearance having been subject of much favorable comment. The boats are 72 feet long, 15 feet in the beam, and draw about 6 feet of water. One, called the Raven, is powered with a Standard 3-cylinder 80-h. p. engine and a 5-h. p. Standard hoist, and the other, the Condor, has a 3-cylinder 110-h. p. Standard. Both boats have electric lights and good living accommodations, and they are going north under their own power. An 80-h. p. Standard engine was also put into the A. P. A. tender Stork this season.

Peter Swanson, the well-known boat builder of Tiburon, is preparing to build a new shop at the foot of Eighth or Ninth avenue, Oakland.

Frank Stone, formerly of San Francisco, who started a boatshop in East Oakland a couple of years ago, is very busy at present, and is taking on a larger class of work than he has been handling in the past, necessitating a number of improvements in his plant. He has just finished driving piles for a temporary ways to build a pair of 1100-ton steam schooners, one for Sudden & Christesson and one for J. R. Hanify & company, to be 238 feet long and 43 feet wide, with 17-foot depth of hold, and powered with steam engines built by the Main Street Iron Works.

G. W. Kneass is building nearly three dozen 20-foot launches of a standard design, all powered with 4-h. p. Union gas engines, for steamers under construction at the Union Iron Works.

The Oakland Launch & Towboat company's tug Dixie has been at Petaluma for the last couple of weeks, having a 115-h. p. Corliss engine installed. All this company's boats are now driven by engines of this make.

The flat-bottomed bay scow H. Eppinger has been at H. Anderson's ways at Hunters Point recently, and in addition to other overhauling, is having installed a pair of twin 35-h. p. Union en-

Service Boats for Hawaii



John Twigg & Sons company about the middle of April launched a new 50-foot motor cruiser, named the Wainaku, for the Matson Navigation company's use in Hawaiian island waters for ferry and towing work. She is about 11½ feet wide and 4½ feet deep, with torpedo stern, and is

powered with a 50-h. p. Union engine, which, as well as the steering gear, will be operated by one man from a stand behind the engine room, which is placed well forward. Except for a slight raised engine room the deck is flat, and is all covered with an awning.

This type of vessel, the flat-bottomed, square-bowed scow, usually schooner rigged, was a very prominent feature all over San Francisco, San Pablo and Suisun bays a few years ago being used in great numbers to transport hay and grain, brick, lumber and general produce between points on the upper bay and lower river districts. Of late years it is being superseded by the larger capacity barges, towed by gasoline boats; but there are still a large number of the scows in use, and to hold their own in this age of gasoline they are gradually being equipped with auxiliary power. There are now comparatively few of these boats depending on wind alone.

G. W. Kneass is putting the 4-h. p. Union engine into one of his standard 20-foot yawl launches for the Standard Oil steamer Acorn, now about finished at the Union Iron Works.

The Morgan Oyster company has brought its little tender Independence down from Shoalwater Bay to be overhauled at Anderson's plant, and is overhauling its big freight and towboat Eagle at the same place.

A fine power trawler and towboat, 65 feet long, was launched May 14 by M. Pasquinnucci at Sausalito. She is propelled by an 80-h. p. Imperial engine.

The Atlas Gas Engine company's agent at San Pedro has just built a 30-h. p. towboat for the Union Oil company, and is now working on about a dozen of the standard tuna fishing boats for Japanese fishermen, which will be equipped with 35-h. p. Atlas engines.

The power schooner Anvil, built for the Nome trade about ten years ago, has recently changed owners and has been sent to the Atlas engine works for a new engine. When she completes overhauling she is to be put on a Mexican run, it is understood.

Wm. S. Brustar, Jr., of Oakland, has just finished a 22-foot boat, powered with a 12-h. p. Loew-Victor engine, for the Pacific Gas & Electric company. He has also built the hulls for two launches, one 32 by 9 feet and one 36 by 10 feet, which are to be sold, and power will be installed as desired by the buyer. He is also building a 28-foot steam launch and some whaleboats, etc., for the lighthouse tender Cedar, being built at Long Beach.

The new Standard Oil Barge No. 8 is powered with a 150-h. p. Union engine.

Henry Peterson, the San Francisco launch operator, is taking figures on the construction in a northern yard of half a dozen 40-ton barges, to be used in connection with his fleet of towboats to handle the rapidly-growing lighterage business around San Francisco bay.

The Associated Oil company's motorship Avon was laid up early this month for minor repairs at the company's yards at Alameda point.

The power schooner Agnes Jones, one of the oldest freight schooners on San Francisco bay, was sold at auction May 10 at the Franklin street wharf, Oakland, the purchaser being E. H. Warren, of Oakland, who bid her in at \$500. She was built

in 1877, at a reported cost of over \$4,000, and has been rebuilt twice since.

The Moore & Scott Iron Works, of San Francisco, which has lately taken several large ship-building contracts, has decided to move its main offices to the shipyard at the foot of Adeline street, Oakland. An office building will be erected immediately, covering a space of 52 by 121 feet, at the entrance to the yards, and work is being rushed on the installation of new shipbuilding machinery. R. S. Moore is manager and J. A. Moore superintendent of the works.

H. Anderson has just started work on a contract for H. Hackfeld & company, the large Hawaiian concern, for an exceptionally strong power boat for unusual service in the Hawaiian islands. The interesting feature is the fact that the boat's home port is a plantation where there is no landing, and when not in use the boat will have to be hoisted up a 160-foot cliff by a wire cable. To withstand this strain the frame will be specially braced, and a hoisting ring at each end will be fastened to the frame and through the keel by a heavy steel band. The boat is being made 38 feet over all, with a beam of 10½ feet and a depth of 5 feet. The frames are of bent white oak, 2½ by 3-inch, with an ironbark keel and stem and extra heavy planking. The power plant will be a 30-h. p. oil-burning engine.

HAWAIIAN PILOT BOATS COMPLETED.

Two pilot boats, the "Kahului Pilot" and the "Hilo Pilot," have just been finished at Burton, Wash., and the former was shipped to Hawaii on May 6th, the latter following later this month. They are 35 feet 3 inches long over all, 34 feet long on the water line, 8 feet 6 inches beam and draw 3 feet 4 inches.

The pilot boats will be equipped with 40-h. p., 4-cylinder, 4-cycle Buffalo engines which will give them a speed of 14 miles per hour. They were designed by E. B. Schock and built by G. E. Taylor. Port Orford cedar and Douglas fir were worked into their construction to make them staunch and able for hard service to which they will be put. They will be stationed respectively at the points for which they are named.

PACIFIC BUILDER TURNING OUT MOTOR SCHOONER FOR EASTERN MAN.

The St. Helens Shipbuilding company is building a three-masted power schooner for Capt. Wrightson of Mobile, Ala. The new boat is 160 feet long, 35 feet beam and 12 feet 6 inches deep in her hold. She will have two large hatches for handling cargoes. The oil and water tanks are placed aft of the engine room.

She will be equipped with two Fairbanks-Morse 4-cylinder semi-Diesel engines developing 100 h. p. each, which will drive 50x42-inch propellers with an approximate 950-inch blade area at 350 r. p. m. The engines are fitted with Fairbanks-Morse No. 4 reversing gears and plunger type of circulating water pumps.

A Unique Motor Fish Carrier

Lo, the poor Indian, and his noble brethren grow fewer in number each year, according to Uncle Sam. This is not surprising, modern life is too full of shocks for a simple savage. No sooner has he succeeded, through diligent application, in accustoming himself to civilization's astonishing kinks when up bobs Necessity's mother, Old Lady Invention, who bowls him over with a fresh jolt. Any child of nature can stand one dose of civilization but it takes the hardy constitution of a tango tripper to thrive under daily applications.

The amphibious aborigines of Alaska were shocked by the appearance of the first motor boat. Between the primitive dugout and the simple form of "smoke boat" which first burst upon the startled gaze of the natives lie many centuries and to bridge this gap in a day was no simple matter. Yet the Alaskan Indians did it and so effectively that they themselves are today large users of motor boats and heavy purchasers of marine motors.

The brunt of a second and greater shock fell a few days ago on the natives in the vicinity

are built along the general lines of a scow though having considerable sheer forward. They are equipped with Kemp motors of 4 cylinders developing 35 h. p. and driving a 5½ foot propeller 1000 revolutions a minute. The motor was sold through the Chandler-Dunlap Co., of Seattle, agents for the makers the Kemp Mfg. Co., of Muncie, Ind.

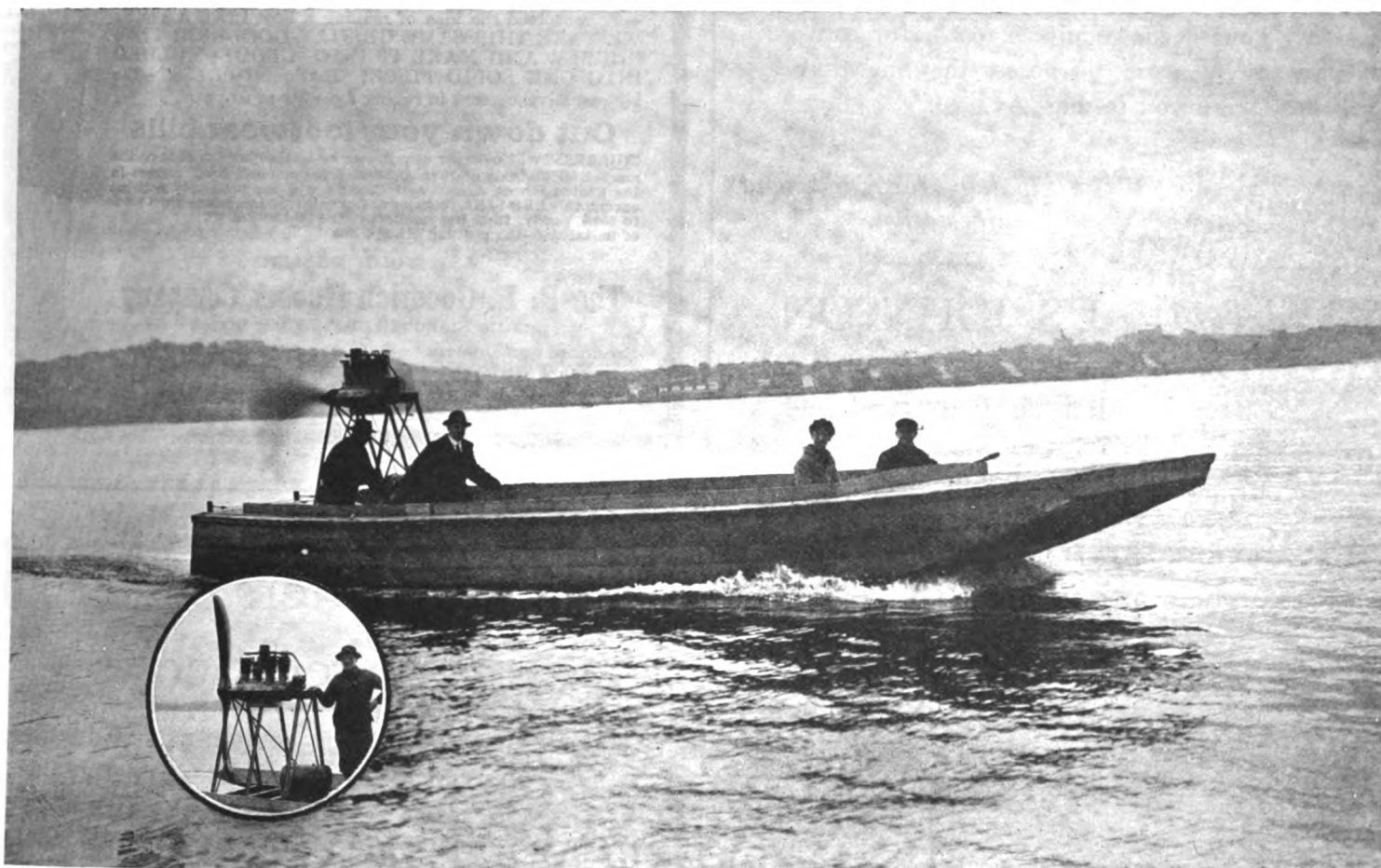
The Northwestern boat was completed in Seattle and tried out on Elliott bay where she developed about 12 miles an hour against the wind, proving satisfactory in every way. She was afterwards loaded on board the bark J. D. Peters and taken north for this season's operations.

Mr. Wright's boat was completed in knock down form at King & Winge's and then shipped north, the owner planning to install the engine at the cannery.

One of the things which strongly recommend the new type of carrier to cannerymen is its low cost. It is understood that these boats without the engine cost about \$800. Their efficiency is nearly equal to that of the ordinary drive craft.

when there are special circumstances which render its employment specially desirable. Chief among its applications is perhaps in connection shallow draught boats for services on rivers, the depth of which does not permit of the employment of craft with a greater draught than a few inches, or at the most a foot. There are many such waterways and rivers, particularly in the Dominions overseas, and hitherto traders on them have been unable to reap the advantage of motor propulsion, especially as in most cases only a very low speed is required with a correspondingly large propeller, altogether out of proportion to the available draught of water. One of the special correspondents in Mesopotamia has given an account of a hospital ferry in use on the Tigris, which is fitted with an air propeller and a 50 h. p. semi-Diesel engine, and "makes more noise than a minor battle."

It might be thought that if submerged propellers are unsuitable for slow shallow draught vessels the aerial propeller would be equally inefficient, since it is apparently adapted for propulsion at high speed and not at such speeds as those re-



AERIAL PROPELLED CANNERY TENDER FOR NORTHWESTERN FISHERIES.

AERIAL PROPULSION OF BOATS.

Although little is heard of the use of aerial propellers instead of the ordinary submerged type for the propulsion of motor craft, steady progress, says The London Times, is being made in this direction, and what is more important, the possibilities and limitations of the arrangement are being more fully understood. At first sight it might be considered that a propeller which revolves in the air can never be so efficient as one turning in the water where more resistance is offered, but there has during the past few years been a great advance in the design of aerial propellers, with the result that their efficiency is now fairly good and may in certain cases exceed that of a submerged propeller. Their use as applied to motor-boats is still more or less in the experimental stage, and it is improbable that the best results have yet been attained; nevertheless, on comparative tests that have been carried out with the two types, it has sometimes been found that there is practically no difference in the speed of the boat whether a submerged or aerial propeller be employed for its propulsion.

It may not at once be clear why there is any reason against the accepted means of propulsion, and in general it may be taken that the use of an aerial propeller is to be recommended only

All the leading types of motor have been employed for aerial propulsion, including the semi-actuated for the vessels referred to, which may be no greater than three or four miles an hour. But from results attained by aerial-propelled tugs and barges it has been proved that this is not the case, and that aerial propellers can be designed efficiently both for relatively heavy low-speed craft and for light high-speed vessels of the skimmer or hydroplane type. In fact, it seems that these two classes of boats are the most suitable for aerial propulsion, and certainly by far the greatest number of examples at present in service are comprised in these categories.

As an instance of the success of aerial propulsion, a 30 ft. boat, drawing 9 inches, in which a 15-h. p. engine is installed driving an aerial propeller of 8 ft. diameter, has been in service, towing 15 or 20 shallow-draught punts, each loaded with about two tons. At the other extreme is the type represented by an 18 ft. skimmer, which attains 30 miles an hour, with a 50-h. p. motor driving a two-bladed aerial propeller. These results are typical, and appear to be equal to anything attained by the same power driving a submerged propeller.

Engines and Propellers.

All the leading types of motor have been employed for aerial propulsion, including the semi-

of Dundas bay when there appeared upon the waters of Icy straits a few kind of power boat whose propeller moved not in the water but in the air.

The new strange craft was the first aerial driven cannery tender to be put into commission. It represents the successful fruition of an idea conceived by A. Nelson, superintendent of the Northwestern Fisheries Co., of Seattle, and carried out with the assistance of Jack Read and the builders, King & Winge. The new type of fish carrier was evolved for the purpose of solving a special problem presented on a part of the fishing comes territory at Dry bay where the water is so shallow as to make it difficult to transport the fish taken there to the cannery at Dundas. The practicability of the plan was early apparent and shortly afterward a second craft was ordered by the well-known cannery man, Frank Wright, of Village Point, Wash., for his Copper River cannery.

Both vessels are thirty-two feet long, eight feet in the beam and have a draft varying from two inches, while light to from three to four inches when loaded. They will be able to carry about 1,000 salmon. They are built of spruce, lap traked and bare, exceptionally light yet strong. As will be seen from the photograph of the Northwestern Fisheries boat reproduced above they

Diesel, paraffin, and petrol motors, the last only for high-speed boats. As in any case, there has to be a chain drive to the propeller, its speed of revolution can be varied within wide limits for maximum efficiency, to suit the craft which has to be propelled. This is a particularly advantageous feature, owing to the diversity of the boats on which aerial propulsion is used, and the speed of rotation of the engine does not have to be seriously taken into account when designing the installation.

It is an almost invariable rule to adopt two-bladed propellers, although there does not seem any reason why three or even four bladed propellers should not be employed in certain cases, especially where a large blade area is desirable. In one or two instances tractors have been utilized, but, this arrangement does not seem to give the best results, besides possessing the disadvantage of inconveniencing those who are on board, owing to the draught of air that is created. The question of danger with a rapidly-revolving propeller also has to be considered; this is minimized, if not entirely avoided, by properly protecting the propeller with an open wire netting.

There is little likelihood that the aerial propeller will ever in any sense replace the submerged type, since in the larger number of cases of the application of the marine motor to the propulsion of boats it does not offer any particular advantages, and indeed possesses some disadvantages. But there are many instances in which the submerged propeller is unsuitable or even impossible, such as in the extremely shallow-draught craft mentioned above, and it is here that a wide field of application for the aerial propeller is opened out.

MOTOR DRIVEN VESSELS IN SOUTHERN CALIFORNIA.

(Continued from Page 11.)

such a moderate price that he was able to invade the San Diego field successfully on several occasions during the past year. Among the boats built for the fishing industry are:

Name	Owner	Lgth	Tonnage	Eng.	h.p.
Keibono II—K. Seiko		44.5	11.18	Imperial 40	
Asama II—S. Asari		44.6	11.60	Imperial 40	
Asia III—A. Oka		44.6	11.00	Imperial 40	
Yorai—Y. Furukawa		39.8	8.25	Standard 30	

Kauto—G. Nochizuki	40.0	8.35	Standard 30	
Kikuma—M. Marri	44.6	10.89	Standard 40	
K. M. Kikiwa—K. Makamura	42.2	8.51	Imperial 35	
Kiyo—H. Houda	40.1	8.26	Standard 30	
Yamato—D. Tani	44.6	11.02	Imperial 40	
Not named—Al Larsen	40	8.35	Union 30	
Not named—Al Larsen	40	8.35	Union 30	
Not named—Al Larsen	40	8.56	Union 30	
Not named—Al Larsen	40	8.56	Standard 30	
Nebraska—Nels Nelson	40	8.77	Standard 20	

Owing to the late entrance of several tuna canneries into the canning campaign, there has been a considerable scramble for boats, and builders in some instances, have gone ahead of the demand and built boats to place in stock, as they believe there will be plenty of purchasers before the season has advanced very far. J. Hatashita had a boat building location at Zinc station, near Long Beach, last year, but decided that he was too far from shore and has now established himself and his company, known as the California Boat Building company, in a splendid location immediately adjacent to the Marine Mechanical Works, near the drawbridge at the entrance to the west basin on the inner Los Angeles harbor. A good system of ways and shunting apparatus is being installed, so that many boats can be hauled out and switched to any desired place in the yard with despatch. The boats which Hatashita has built include:

Name	Owner	Lgth	Tonnage (gro.)	Eng.	h.p.
Asashio—W. Ura		41.6	9.00	Union	35
Azuma—S. Tamashita		43.5	9.87	Atlas	40
Empire—Not given		42.7	10.29	Union	35
Ramona—T. Toma		42.6	9.27		
Rose—H. G. Tanaka		40.8	9.19	Union	35
Sunbeam—H. Hatashita		42	9.00	Union	35
Sunshine—G. Matsuka		45	10.51	Union	40
T. T. I.—Tuchiana		40	8.29	Pacific	30
Nikko—I. Togo		48	15.34	Gaertner	45
Ocean Queen—Paul Greget		60	31		
Not named—(Stock)		42.9	8.98		

This company has contracts for five more boats at present, three of which will be equipped with Corliss engines. S. Asami, who operates a boat building establishment at Long Beach, has built nine boats among which are the fishing boat Alaska, 41.8 in length and having a gross tonnage of 9.0, for M. Aoki. He has also built the forty-four foot boat North American for A. Ono; the Tacoma, a forty footer for S. Kavaguchi, and the Tomoe, for K. Matsuuki. Nearly all are equipped with Corliss engines.

J. W. Evans has built during the past year at

his home at Terminal the fishing boat Wolfram, 50.4 in length and equipped with a Corliss engine. He also built the Zenobia, 45.6 in length, also equipped with a Corliss, for Philip Westhoff. He is now building a tow boat for the General Petroleum company after designs made by C. D. Callahan.

The principal local activity along larger lines is represented by the operations of the California Shipbuilding Co., of Long Beach, known until recently as the Craig Shipbuilding Co. This company is building the U. S. submarines L-6 and L-7, which are to be equipped with 650 h. p. Diesel engines of the Bush-Sulzer type. The construction is proceeding under the supervision of Mr. F. Mackle, Lieut. W. R. Munroe, U. S. N., inspecting the machinery. The Bush-Sulzer boats differ from the usual type in that they submerge on an even keel. It is expected that the boats will have a surface speed of 15 knots, while they will probably develop 11 knots submerged.

SAN DIEGO.

San Diego is enjoying its portion of prosperity in the boat building business which has come as a result of the development of the canning of tuna and other fish, as well as the harvesting, drying and burning of kelp. The San Diego Marine Construction company, of which T. C. Spalding is the president, Karl Kline, vice-president, and C. W. Stose, secretary, treasurer and superintendent, has built during the past year the following boats:

Name	Owner	Lgth	Engine, h.p.	Type boat
Messenger, S. D. M. Co.		26	Sterling, 20;	towboat
Crescent, Crescent Bt Co.		65	Imperial 80;	passenger lanch
Nishiki, Y. Kato		40	Union 30;	fishing
Aya, S. Nyegi		42.6	Union 30;	fishing
Vagabond, Guy Silvia		30	E. Standard, 10;	fishing
Dory, (Stock)		18	Eagle 2 1/2;	fishing
Skukum, H. E. Wheeler		38	Union, 20;	fishing
Jose, I. Imoto		42	Union, 35;	fishing
Alenaire, H. Wallen		65	Union, 80;	pass. launch
Not named, Pac Tuna Cng Co.		30	Waterman, 3;	skiff
Avis, I. Kowasaki		42	Union, 32;	fishing
Suez, N. Sumi		42.6	Union, 35;	fishing
Premier, U. Noba		45	Union, 35;	fishing
Not named, J. Claget		45	Imperial, 25;	fishing
Vampire, William Gilmore		37	Mercedes, 40;	cruiser

Other builders at San Diego are W. U. Casey, who has built the

Bijou, W. U. Casey	53.5	Hercules, 30;	cruiser
Andy, W. Applebotha	40	Buffalo, 40;	fishing
Casey, Joe McNevin	28	Robbins, 8;	sloop
Umatilla, J. Hakes	40	Hercules, 20;	fishing

Shipshape

This picture of the engine room of the TARPON II, one of New York's express cruisers, shows the trim, compact design of

Wisconsin

CONSISTENT

Motors

With all working parts completely enclosed. There is plenty of oil in the bearings, but none in the engine room to soil hands or clothing.

The motor shown is Type P. M.; 6 cylinders; bore 5 3/4 inches; stroke 7 inches. Wisconsin Motors are manufactured in 4, 6 and 8 cylinder types. Catalog on request.

WISCONSIN MOTOR MFG. CO.

Station A—Dept. 305 Milwaukee, Wis.

Pacific Coast Distributors

EARL P. COOPER CO.,

1428 Bush St., San Francisco, Cal.

W. F. McKENNEY, 68 First St., Portland, Ore.

CHANDLER-DUNLAP CO., Seattle, Wash.

Christian Telson has built the following:

Not named, Star & Crescent
 Boat Co. 65. Union, 150; towboat
 Not named, C. Telson 25. Standard, 4; skiff.

The A. R. Robbins Marine Engine Works manufactures an engine which uses "tops," burning three gallons per hour for a 35 h. p. engine at full speed and can be run for nine hours on ten gallons of distillate at 90 revolutions per minute.

Walter Bezanson is the boat builder for the Robbins works, having built the following boats in the recent months:

Name	Owner	Lgth	Eng.	h.p.	Type	boat
Not named, Spreckels	Com.	Co. 35	Robbins	35	3 cycle	
Not named, Premier	Pkg.	Co. 45	Robbins	35	fishing	
Not named, Pac. Tun. Cng.	Co.	45	Robbins	35	fishing	
Not named, Pac. Tun. Cng.	Co.	45	Robbins	35	fishing	
Not named, Pac. Tun. Cng.	Co.	38	Robbins	35	fishing	
Julia, S. Sousa			Robbins	8	fishing	
Adele, Lew B. Harris		48	Atlas	8	yawl	
Apex, Wm. Gilmore		40	Neptune	30	(rebuilt)	flag
Alpine, W. Gilmore		23	12	racing		
Not named, W. Bezanson		32	40	racing		

SEWARD MADE PORT OF ENTRY.

With the designation of Seward, Alaska, as a port of entry that city was brought within five days of Chicago and six days of New York. From Prince Rupert to Seward the sailing time is two days, and from Prince Rupert to Chicago the railway time is three days and four days to New York. With the growing importance of Seward as a port and the increased demand for the products of Alaska in the East the necessity for an open port was realized and action taken by the treasury department.

SKINNER-EDDY YARD WELL UNDER WAY.

(Continued from Page 8.)

so as not to interfere with the rapid stowage and discharge of cargo. The winches for the main cargo hatches will be placed on strong winch platforms raised high above the deck for the convenient loading of deck cargoes.

The vessels will be arranged so that either coal or oil fuel can be used. The accommodations for officers are located in steel deck houses amidships, the crew being berthed in the poop.

The two oil tankers which have been sold to the Standard Oil company will be constructed

under the Isherwood system. They will be 433 feet 6 inches long over all, 57 feet moulded beam, 31 feet 6 inches moulded depth, 25 feet moulded draft, 9,500 tons dead weight and will have a sea speed of ten and a half knots.

They are steel, single screw steamers with the machinery aft. The hold is divided into tanks for carrying oil in bulk. The 'tween decks in the wings outside of expansion trunks will be used as summer oil tanks. A double bottom will be constructed under the machinery space and fitted for reserve feed water. A tank about ten feet deep will be constructed in the fore hold for oil fuel or water ballast. The fore and after peak tanks will be used for trimming tanks.

The vessels will be constructed with straight stems, elliptical sterns, and two continuous decks. There will be a raised forecastle, a short bridge house amidships and a full poop aft. There will be three masts with two cargo booms on the fore and main masts. Captain's and deck officer's quarters, chart and wheel house will be in the midship bridge house. Engineers, firemen, cooks, etc., will be located in the poop.

The company have completed the necessary buildings for their plant among which are the punch and shears shop, the smith shop with its bar furnace and bending slabs, the mold loft, office building and power plant. Another large building to house the carpenter shop, joiner shop, pipe shop and store room is under consideration.

The railway enters the yard at the East side and runs clear through to the water. Between the gate and the smith shop is located the plate and bar yard with the track running down the middle of it. Steel can be handled by locomotive cranes from there to the smith shop and to any part of the plant. Material is handled on the boats by locomotive cranes and be a system of overhead trolleys. At each end of the slips are two posts 110 feet high, well guyed and anchored. Between these posts an inch and a half steel cable will carry a trolley which is to handle the material. At each post a 35 h. p., double drum winch will furnish the power for pulling the trolley back and forth on the cable and raising and lowering the material. No sheds will be built over the slips at present.

THE ISHERWOOD SYSTEM.

The Isherwood system of ship construction which is being so largely adopted in commercial vessel designs and which is being used in the case of the Skinner-Eddy vessels, is an arrangement doing away with transverse framing. All of the framing is made up of fore and afters, generally of channel section, worked in between and bracketted to the bulkheads. This does away with all of the complicated bending necessary in building ships with transverse framing and provides a stiffer body that has less vibration.

In cases where the transverse stiffness provided by the bulkheads is not sufficient heavy transverse stiffeners are built in, the fore and afters running through them. One of the great difficulties of oil tanker construction has been to get oil-tight seams where triple riveted butts were necessary in the plating. With the new system the longitudinal strength is sufficient to entirely do away with the triple riveted butt and this may account for the fact that practically all of the oil tankers under construction are being built under this system. Then too the system provides a much more easily drained hull than the old transverse framing.

The doing away with the heavy keelsons and built-up longitudinals by this system makes the hull more adaptable to carrying bale goods and largely increases the dead weight capacity. The saving in material used in construction is about six per cent and the hull is much easier to set up. Of twenty-two vessels under contract at the Union Iron Works in San Francisco all of them are to be built under the Isherwood patents except one passenger vessel.

The Columbia River Packers' Association is having a tender built by the Astoria Boat company, of Astoria, Ore., for use on the Columbia river. She will be 63 feet long, 16 feet beam, has 4.1 feet depth of hold and measures 15 tons net. She will be equipped with a 45 h. p. Fairbanks-Morse heavy oil engine.

John Wilson, boat and shipbuilder of Seattle, turned out the cannery tender "Fanshaw" for the Weise Packing company. The length of the new tender is 65 feet, beam 16 feet, draft 6 feet. She is equipped with a Fairbanks-Morse heavy oil engine which gives her a speed of 11 knots.

GOLD SEAL Crack Proof Boots SEWARD SOLE

THE BEST and STRONGEST MANUFACTURED TO MEET THE DEMAND OF THE

FISHING TRADE

Stout's Patent Snagproof
Boots

Stout's Patent 'Longshore
Boots

ALL GENUINE
GOLD SEAL
CRACK PROOF
BOOTS
NEAR THIS
HEEL IMPRINT
AND OUR
GOLD SEAL
TRADE MARK
ON LEG



NOTE

"Knee Patch"

"Reinforced Inside Knee Band"

"Reinforced Seward Sole"

OILED CLOTHING

For Sale by All Reliable Dealers

We Also Manufacture a Complete Line of
BELTING - PACKING - HOSE

GOODYEAR RUBBER CO.

SAN FRANCISCO, CAL.

587-589 Market St.
R. H. PEASE, President
J. A. SHEPARD, Vice-President

PORTLAND, ORE.

61-67 Fourth St.
C. F. RUNYON, Secretary
R. H. PEASE, Jr., Treasurer



FOR MEN WHO WORK
IN THE WET



TOWER'S FISH BRAND WATERPROOF CLOTHING APRONS, SLEEVES and HATS

Fish Brand goods are made of the best materials. Sized big for comfort, strong at every point. In fact, made for men who give waterproof garments the very hardest wear.

For 80 years the greatest value in the Waterproof Clothing market.

SATISFACTION GUARANTEED

At Wholesale

Seattle. Northwestern Shoe Co. West Coast Rubber Co.

Portland. Fleischer, Meyer & Co. Hirsch-Weis Mfg. Co. C. R. Winslow & Co.

San Francisco. Ames, Harris, Neville Co. Buckingham & Hecht. Cahn, Nickelsburg & Co. Greenebaum, Weil & Michaels. Moore-Watson Dry Goods Co. New York Belting & Packing Co. O'Rourke, Eubanks Hat Co. Levi Strauss & Co. C. R. Winslow & Co.

Los Angeles. Cohn, Goldwater & Co. Wm. H. Hoegee Co. Klein-Norton Co. Norton Bros. & Morris

**A. J. Tower Co.
BOSTON**

Pacific Coast Branch
SAN FRANCISCO



Mention Motorship.